

Aegean Strategies

Studies of Culture and
Environment on the
European Fringe

P. Nick Kardulias and
Mark T. Shutes



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Greek Studies: Interdisciplinary Approaches

General Editor: Gregory Nagy, Harvard University

On the front cover: A calendar frieze representing the Athenian months, reused in the Byzantine Church of the Little Metropolis in Athens. The cross is superimposed, obliterating Taurus of the Zodiac. The choice of this frieze for books in *Greek Studies: Interdisciplinary Approaches* reflects this series' emphasis on the blending of the diverse heritages—Near Eastern, Classical, and Christian—in the Greek tradition. Drawing by Laurie Kain Hart, based on a photograph. Recent titles in the series are:

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Aegean Strategies: Studies of Culture and Environment on the European Fringe, P. Nick Kardulias, College of Wooster and Mark T. Shutes, Youngstown State University

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P. NICK KARDULIAS AND MARK T. SHUTES

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To my brothers, George and John, for their friendship and encouragement over the years—PNK

To my wife Mary Ellen and my daughter Megan who keep me going, and to my friend and colleague Thomas Wilson who got me started—MTS

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Greek Studies: Interdisciplinary Approaches

Foreword

Gregory Nagy, General Editor

Building on the foundations of scholarship within the disciplines of philology, philosophy, history, and archaeology, this series spans the continuum of Greek traditions extending from the second millennium BCE to the present, not just the Archaic and Classical periods. The aim is to enhance perspectives by applying various disciplines to problems that have in the past been treated as the exclusive concern of a single given discipline. Besides combining the strengths of older disciplines, as in the case of historical and literary studies, the series encourages the application of such newer ones as linguistics, sociology, anthropology, and comparative literature. It also encourages encounters with current trends in methodology, especially in the realm of literary theory.

Aegean Strategies: Studies of Culture and Environment on the European Fringe, edited by P. Nick Kardulias and Mark T. Shutes, is a lively anthropological reassessment of Greek culture within the specific environmental setting of the Aegean area of the Mediterranean. The term "Aegean," focusing as it does on a circumscribed area within the Mediterranean world, is more narrow than "Greek" if we consider the geographical range of Greek culture throughout history. The same term is also more broad, however, if we apply it to the cultural range, through time, of the wide variety of people in that area who have been identifying themselves as the equivalent of "Greeks" over the last four millennia or so. This book is about these people—how they lived and live to this day in the material contexts of their environment. For the contributors, as the editors point out in their final remarks, "it is not possible to imagine Greek cultural systems sheared from their environmental roots and studied like some hydroponic hothouse flower."

What awaits the reader of this book is a veritable treasury of information (and interpretation) concerning the interaction of nature and culture in the Aegean world. There will be many different points of interest for different readers (my own favorite moment comes at Chapter 13, with its detailed description of winnowing practices on the islands of Amorgos and Karpathos). To read this book in all its rich detail is to experience a sort of diachronic *Works and Days*.

Acknowledgments

Any scholarly work is a collaborative effort, and edited volumes are even more so; thus there are many people to thank. We extend our gratitude to all of the contributors for their patience and diligence as we assembled and revised this collection of articles. The perspicacious reading of many of the papers by E. Michael DiPaolo, Dianna Rhyan, and Robert Weaver greatly facilitated our editing chores. Sharon Duchesne and Michael DiPaolo assisted greatly in the preparation of the manuscript, supported by funds provided by Kenyon College and the College of Wooster, respectively. In addition, we thank John White, Chair of the Department of Sociology and Anthropology at Youngstown State University, for providing the funds for the scanning and printing of most of the figures, and Floyd Jackson, Carl Leet, and Renee Vivacqua of the Youngstown State University Media Center for their assistance in preparing the final copies. Chapter 3 ("Five Thousand Years of Land Use and Abuse in the Southern Argolid, Greece") was reprinted courtesy of the American School of Classical Studies at Athens from its journal *Hesperia*, volume 55, pages 103-128, 1986. The Society for the Promotion of Hellenic Studies granted permission to reprint Chapter 13 ("Agrarian Ecology in the Greek Islands: Time Stress, Scale and Risk") from the *Journal of Hellenic Studies*, volume 109, pages 41-55, 1989. Both journals allowed us to modify the reference formats to fit the style adopted for the present volume. We also wish to thank Gary F. Fry, Professor of Archaeology at Youngstown State University, for his continuous support and encouragement during the preparation of this volume. We thank Gregory Nagy for giving us the opportunity to publish this volume in his series, and Robin Adler and the editorial staff of Rowman & Littlefield for their patience and cooperation in the preparation of the manuscript. Finally, we wish to add a special thanks to Mark Knowles, Ph.D., Coordinator of the Language Learning and Resource Center at Youngstown State University, for his expertise and patience during the printing of the camera-ready copy for this manuscript.

Individually and together we have drawn inspiration and support from friends and family members. We wish to dedicate this book to George and John Kardulias, Mary Ellen and Megan Shutes, and Thomas Wilson. Each of these people, in his or her own way, has contributed to the substance or the spirit of this volume.

Preface

This volume presents both an overview of and detailed papers on environmental studies in the Aegean area. The book is based on a symposium held at the 1993 Annual Meeting of the American Anthropological Association and includes papers by cultural anthropologists, archaeologists, and earth scientists, all of whom deal with the relationship between culture and environment; many of the papers deal specifically with the problem of reconstructing past environments or making sense of contemporary ecological settings as they relate to a variety of factors (i.e., the physical surroundings, and economic, political, and social systems). The focus of the session was twofold. First, the papers were drawn from interdisciplinary research in an area, Greece and the Aegean, that has in some important ways been marginal to the anthropological endeavor. Increasingly, however, the interdisciplinary work conducted there by scholars associated with large-scale projects has become quite sophisticated, offering to our discipline not just additional data to validate or test hypotheses promulgated elsewhere but also substantial contributions to the development of method and theory generally. Recently, a major debate has emerged concerning the viability of the four-field holistic approach in anthropology. What these papers demonstrate is that we still do some of our best work when it is informed by the insights from researchers in all the subdisciplines of anthropology and other fields. Second, the papers have an environmental or ecological focus. All of the contributors deal in some manner with the interaction between humans and the landscape. If, as Shakespeare noted, all the world's a stage, and all the people merely players, then it is imperative that we understand that humans, individually and collectively, often dramatically shape that stage upon which they strut.

A word about Greek ethnography is in order here. When we say that ethnographic work in Greece has been largely marginal to anthropology we do not mean to say that there are no significant studies. Many scholars are familiar with the work of Michael Herzfeld (1982, 1985, 1987, 1991), Loring Danforth (1982, 1989), and others (Cowan 1990; Seremetakis 1991) whose orientation follows an interpretive/symbolic bent. While this work is certainly valuable and innovative, there remains the question of how much it contributes to the interests of persons with an ecological/materialist focus. By and large the ethnography of Greece, and for that matter, much of Europe, has not become part of the mainstream of anthropology and has had little impact on theory and methodology in the discipline as a whole. We also do not intend to imply that the symbolic and ecological approaches are irreconcilable. There is a complementarity in the material each viewpoint presents. To assume that people make practical choices as strategic decision-makers does not negate the fact that they act symbolically; rather, the ecological approach provides a better understanding of the constraints within which the symbolic universe must operate. The papers in this volume

attempt to demonstrate how humans negotiate these social processes, but with a stress on the environmental parameters. The value of the interdisciplinary research from which many of the papers derive is that it provides a more comprehensive understanding of the complexity in human-landscape relationships.

Another concern we wish to address is what we mean by the terms Greece and Europe. As Nagy points out in the Foreword, these terms have had, and in some ways continue to have, variable meanings. One view suggests that Greece and Europe are circumscribed geographical regions; another major perspective argues that the terms are cultural constructs. We support an integrated approach which holds that people impose meaning on the landscape, while at the same time dealing with physiographic attributes of their surroundings in practical ways through various subsistence patterns, ideologies, etc. The cultural ecological perspective which we and many of the contributors employ gives considerable play to the symbolic content of human interaction with the environment (see Chapter 1).

For the purposes of this volume, when we refer to Greece we mean the area bounded by the modern nation-state as it has evolved since 1830. Thus, the contributors do not deal with the geographical extent nor the cultural implications of the international Hellenism of Magna Graecia in antiquity. The people within this geographically bounded area have shared a common set of traditions (linguistic, social, religious), while maintaining the local flavor which is the essence of cultural variation. The study of human interaction with the environment stresses the role of ecological considerations which often influence the development of mental or symbolic constructs in an intricate relationship. Nor do we think of Europe as monolithic. As Parman (1997) points out, Europe is more than a geographical region; the term has served as a cultural marker whose parameters have changed over time. Greece is particularly interesting from an anthropological and historical perspective because of its unique position as a source of European culture (variably defined) while simultaneously some modern pundits place the modern nation at both the geographical and cultural fringe of Western society. Friedl (1962) has noted a debate among Boeotian villagers concerning their status as Europeans. What we wish to argue is that people, those inhabiting the area of modern Greece among them, define themselves initially, and in some cases largely, in terms of the interaction with the local environments they confront. Meaning arises out of the daily struggles to gain a livelihood, to establish working relations with neighbors through marriage and other social mechanisms, etc. If we have any hope of getting a better understanding of cultural constructs as forms of social identification, we need to start with those relationships which are most fundamental to human survival.

We bring together in this volume a diverse array of anthropologists and other scholars, all of whom focus on how humans utilize the landscape. Definitions of landscape and region vary (see Cherry et al. 1991; Jackson 1984; Kardulias 1994;

Marquardt and Crumley 1987). We use the terms as linked concepts. Region refers to an area geographically definable by physiographic features such as mountain ranges, streams, etc., within which the residents share a common set of cultural adaptations (language, subsistence practices, religion, etc.). Jackson (1984) argues that a landscape is a human construct, both in the sense of physical modification of the environment and how people perceive their surroundings. We find this a suitable way to think of landscapes, which one can then view as nested in regions. The landscape is the cultural expression of local diversity in a region. The papers in this volume discuss both the broader and more specific environmental contexts from several perspectives. The common focus, however, is the mutual impact of humans and environment on each other. The physical setting of terrain, soils, hydrology, and biota provides the natural parameters within which humans act out the particulars of survival. Culture is a flexible adaptive system through which people respond to perturbations in the environment. Most of the contributors deal with the nature of this ecological interplay, how the adaptations occur at both the large scale (settlement patterns) and the small level (exploitation of local domesticated crops and wild food resources). All stress the active role humans play in this often intricate ecological dialectic.

The region under consideration in this volume is the circum-Aegean area. It encompasses all of Greece, and those portions of Turkey in Europe (Thrace) and on the eastern edge of the Aegean. It includes a large number of islands, such as the Northern Sporades, Thasos, and Samothrake in the north, the Cyclades in the center, Samos, Chios, and the Dodekanese in the east, and Crete on the south. The Heptanesos in the Ionian Sea forms another island group off the west coast of Greece. While the whole region shares a general Mediterranean climate, terrain, and vegetation, there are significant local variations. In addition, mainland and insular differences often lead to distinct forms of adaptation. While technically in Asia, the portion of northwest Turkey included here, just on the Asian side of the Dardanelles, fits well the description of being on the European fringe. The Troad was an important crossroads between East and West for many millennia.

Regional studies in the Aegean have been at the forefront of integrative work of this sort. Projects with such a regional focus grew out of the interdisciplinary effort in Messenia (McDonald and Rapp 1972), Melos (Renfrew and Wagstaff 1982), the southern Argolid (Jameson et al. 1994), and elsewhere (see Cherry et al. 1991) which all began as archaeological investigations. The attempt to reconstruct the prehistoric cultures of the various areas led inevitably to collaborative work among archaeologists, geomorphologists, palynologists, historians, cultural anthropologists, and other specialists. Most of the papers are direct products of such interdisciplinary cross-fertilization, with the many threads all leading to a common ecological theme. The layout of the book reflects three major areas of interest in such work.

The point of departure for any regional assessment must be an understanding of the environmental parameters mentioned above and is thus fittingly the focus of Section I. The initial paper by Zangger et al. describes the recent use of various techniques from the natural sciences (geophysical methods, such as magnetometry, implemented by means of fly-overs; remote sensing, i.e., analysis of data from Landsat, SPOT, and ERS; determination of soils, sedimentation rates, and changes in shorelines by drilling and other geological assessments). In combination with a detailed analysis of ancient urban planning, which draws on studies in architecture, and civil and hydraulic engineering, Zangger and his colleagues have identified the likely location of the Bronze Age harbor of Troy, and the layout of non-elite sectors of the city.

The second paper in the section by van Andel et al., reprinted from *Hesperia*, is an excellent example of the full integration of geomorphological and archaeological data. Based on work in the southern Argolid, these authors identify a sedimentation sequence and link the soil profiles to the shifting nature of human settlement in the region. Beginning with the key question of whether changes in the local environment were due more to human or natural causes, van Andel et al. demonstrate the need to consider a wide range of factors in such transformations.

Archaeologists have a large stake in reconstructing former environments. The second section presents three studies covering two important topics. Moody tackles a perennial problem: is the sparse, rugged terrain of Crete similar to the ancient environment? A related question concerns the timing of the large-scale deforestation of this and other islands. Through the intensive examination of modern ecosystems, pollen cores, and ethnographic data from recent centuries, she concludes that while humans did affect certain events, other occurrences were completely independent of cultural influence. Her work complements that of van Andel et al. in its stress on important changes in the last 5,000-6,000 years.

Athanassopoulos presents some of the data from an important archaeological survey (the Nemea Valley Archaeological Project) in the southern Korinthia. She outlines the alterations in rural settlement patterns during the late medieval and early modern era. She relates the location of sites to ecological and cultural factors; the latter include political decentralization, defense, and economic circumstances. In brief, the medieval pattern was one of dispersed farms on which people practiced intensive cultivation, unlike the early modern nucleated system. From a neighboring area to the east, Kardulias presents data on a Frankish (thirteenth- fifteenth century) site. Using AutoCAD and GIS, the project first reconstructed the appearance of a single site (Agios Vasilios), then used these data as a baseline to assess settlement location on the basis of key environmental factors such as proximity to prime range and agricultural land, and topographic features such as elevation and orientation.

Study of contemporary cultural adjustments to local environments form an invaluable resource for understanding both modern and ancient ecological

relationships between humans and Aegean environments. Chang, an ethnoarchaeologist, examines the effect on pastoralism in northern Greece of hiring illegal Albanian immigrants as herders. She discusses the issues of labor management, access to grazing land in both mountain and lowland sectors, and the development of class relations between herders and the hired assistants. In a related vein, Koster discusses the history and use of public pasturelands in modern Greece, based on fieldwork in Crete, Macedonia, and the Peloponnesos. He presents the ecological and social implication of systems of pasture ownership. As an example of regional variation, on eastern Crete there is both private and public ownership of mountain grazing land in the same area.

A number of papers deal with how Aegean communities subdivide the landscape into different categories. Forbes examines how people make use of the uncultivated landscape. Rather than treat it as a wasteland, the residents of the Methana peninsula and other areas exploit these zones for grazing, wild foods, fuel, and other material. In essence, this practice constitutes an extension of economically viable ecozones without major expenditure of human energy. Clark focuses on a specific aspect of this process, the collecting and sale of wild herbs. She carefully outlines the ecological requirements for the growth of wild oregano, the several varieties of the herb, and the procedures for collecting, preparing, and selling the material. The substantial market for wild oregano made this subsidiary element of the economy an important vehicle for acquiring additional cash, which in turn is used to provide some amenities. People are thus able to expand market access by investing some labor and little else.

Of critical importance in understanding human-landscape interaction is a clear vision of how people regulate the distribution of land, schedule their agricultural activities, and create conceptual categories to assist the other activities. Using ethnographic data from Ancient Korinthos, Shutes examines the various explanations that have been given for the persistence of inheritance rules in Greece that serve to disperse individual land holdings. He concludes that approaches which view Greek farmers as decision-makers under varying sets of constraints offer the most reasonable and accurate accounts of the interaction between social rules and agricultural strategies.

The paper by Allen focuses on the cognitive structure of the relationship between humans and the physical setting in which they live. Allen examines the Maniat conceptions of meaning in the environment. He argues that the people of this rugged region of southern Greece clearly demarcate the worked from unworked sections of the environment. Villagers view the settlements and their associated agricultural fields and orchards as won, and thus differentiated, from nature. In this manner, Allen suggests, Maniats impose order on their surroundings in the continuous struggle (*agonia*) which defines human life.

Finally, from their study of agricultural practices on two islands (Amorgos and Karpathos), Halstead and Jones elicit three key factors which farmers confront. The elements of time stress, scale, and risk are evident in processing

crops and have consequences for the agricultural economy as a whole. Farmers need to balance labor requirements, the role of livestock, and adjustments to schedules in both the short- and long-term. Much like Shutes, Halstead and Jones emphasize the continuous role of decision-making by farmers—successful agriculture within the limitations of island environments requires strategic planning.

In an overview commentary, Parman addresses the question of how interdisciplinary studies, such as some of those in this volume, inform us about the current debate concerning the viability of the holistic four-field approach in anthropology. She considers the question of the contribution to anthropology and general knowledge made by examination of European fringe communities. She asserts the potential the discipline has to deal with global analysis to demonstrate connections between the local and the regional, and even world, system. The cultural concept that we know as Europe offers a rich base of information on which to build such a linked network of analysis.

In the final remarks, Shutes and Kardulias outline briefly the major themes which the contributions emphasize. The major point is the use of an ecological focus in an area in which, until recently, studies of how culture and environment interact were at a superficial level. Within this general approach, a number of the authors follow the cultural ecology model and demonstrate how it provides the framework for discussing a range of particular adaptations. A second theme is the stress on people as decision-makers who actively manipulate all sorts of ecological relationships in an effort to ameliorate their economic and social situations. Third, the papers reflect the evolution of Greek ethnography. The economic, evolutionary, and ecological issues are clearly laid out, and are tied to structural and cognitive factors. To be certain, the tenor of most of the papers is clearly materialist, but the contributors raise issues of interest to a broad range of scholars. Furthermore, the interdisciplinary nature of the studies is clear. Many of the contributions emerged from collaborative projects with prehistorians, but it is clear that these can stand alone, and not just as adjuncts to archaeological concerns.

The book deals with the ecology of Greece in the past and present, and concerns the problem of evaluating the subtle relationship between environment and culture in general. What has become increasingly clear in recent decades is that the eastern Mediterranean area, and specifically the Aegean region, is an excellent place to test ideas and methods developed elsewhere. With a long, detailed historical record, a large corpus of archaeological data, and, more recently, a number of sophisticated analyses of current and previous environmental conditions, the Aegean offers a unique setting to explore the evolution of a landscape through time. More importantly, the volume provides cogent discussion of the subtleties involved in understanding the interactive relationship between humans and their environment over time. The book pays a great deal of attention to both the temporal and spatial dimensions of the

environment. The authors take a critical look at various models that others have used to define the extent of human culpability in the process of environmental degradation. As such, we hope the book will be of interest to cultural anthropologists, archaeologists, ecologists, ancient historians, classicists, and those involved in development studies.

The issue of marginality is one that anthropology as a whole, and the anthropology of Europe in particular, must confront. The papers in this volume demonstrate both the vitality and relevance of work in the Aegean to questions of general interest to anthropology and other disciplines (see Herzfeld 1987). Just as has been the case with archaeological survey, the Aegean offers an ideal setting both to test out and formulate theory. As in the evolution of plants and animals, where populations at the edges of a distribution are most subject to change, just so, work in a "fringe" area like the Aegean can lead to important innovations which ultimately may affect the whole discipline. While Herzfeld (1987, 1991) and others, based on their field work in the Aegean, have made a compelling case for the value of an interpretive approach, we hope to demonstrate that ecological studies in this area also have much to contribute to a wider audience in the social sciences and to the growth of interdisciplinary approaches. The current emphasis on diversity should not lose sight of the fact that the European core is not a homogeneous cultural mass. There is still a great deal to be gained from the examination of areas once thought (mistakenly) to be well understood. In this respect, the work of anthropologists in the Aegean still has much to contribute to the better understanding of contemporary variation and future social, economic, and political adjustments.

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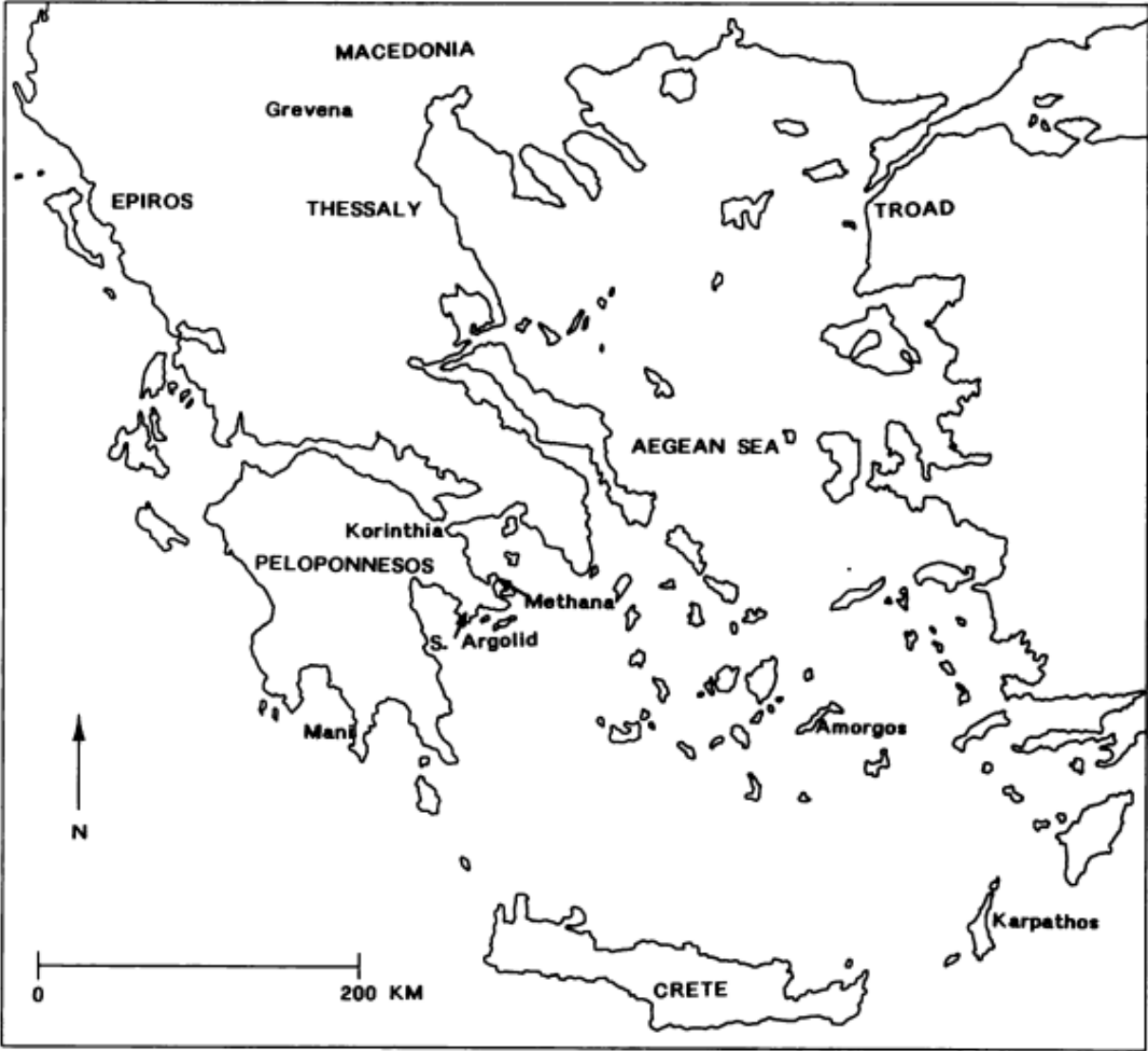
ABBREVIATIONS

BSA *Annual of the British School at Athens*

JFA *Journal of Field Archaeology*

Regional Variation Dimen, M., and E. Friedl (editors)
1976 *Regional Variation in Modern Greece and
Cyprus: Toward a Perspective on the
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Map of Greece



Introduction

P. Nick Kardulias and Mark T. Shutes

At least since the 1930s with the work of Julian Steward (1938, 1955), anthropologists have attempted to articulate the complex interactions between environment and human groups. Over a period of four decades, those efforts blossomed into a distinct approach, cultural ecology, that benefitted from the work of biologists, general systems theory, the reemergence of evolutionist thought, and the detailed ethnographic data that many anthropologists had gathered. Cultural ecology focused on culture as an adaptive mechanism. To be certain, other scholars had discussed similar issues. For example, Evans-Pritchard in his classic work on the Nuer (1941) reserves an important role for "oecology". The problem with such functionalist explanations, however, was the tendency to follow a tautological line of argumentation, i.e., since humans must adapt to local environments, the nature of that accommodation is almost predetermined. To remedy this analytical flaw, cultural ecologists stress the variation available in local environments, and consequently in human response to ecological conditions. The focus is on the array of options the environment presents, and the human capacity/necessity to make choices. A critical concern is the set of criteria that inform these decisions. We argue that people commonly base these choices on short-term goals or perceived benefits. In our selectionist perspective, the long-term effects are cumulative and derive from a series of such immediate concerns. The human-environment relationship is also a reflexive one. The impacts go both ways, i.e., humans clearly affect the environment, while local conditions set the limits for certain human activities. At times, the effects are more clearly in one of these directions; it is this very issue that a number of the papers in the present collection address.

A major contribution of cultural ecology is the broader definition of environment that it provides. The conventional definition encompasses the physiographic, biotic, and climatological features of a given area. Borrowing from biology, anthropologists used concepts such as eco-niche and carrying capacity to characterize the relationships on which human life depends. Cultural

ecologists cast their conceptual net wider still and argued that if we view people as interactive members of biological communities, then all cultural practices become elements of adaptation. These scholars turned their backs on the notion of culture as a superorganic element to be studied *sui generis*. Instead, some anthropologists viewed culture as an integral part of the relationship between humans and the landscape; kinship systems became, in this view, as much a part of the ecological balance as the hunting patterns of feline predators. Humans and their cultures, as components of the environment, were subject to the same rules and patterns of study as the other elements. The adoption of general systems theory facilitated this process of incorporation and made comprehensible the complex nature of the relationships, especially the element of feedback.

Armed with this expanded concept of environment, anthropologists considered how economic organization, political structure, ideological systems, and other cultural elements contributed to human survival. The materialist perspective implied in the ecological approach has led many scholars to suggest there is a priority or directional causality among the components of culture. In Harris' terms (1979), the infrastructure (modes of production and reproduction) tend to determine the nature of the structure (domestic and political economy, descent rules, etc.) and superstructure (religion, ideology). Thus, many scholars stress the underlying significance of a group's subsistence patterns and how various forms of cultural expression derive from that essential foundation. Unlike the simple-minded environmental determinism of an earlier era, however, cultural ecologists emphasize the human capacity to select one or several options from a set of possibilities and the contingent effects of choosing one path over another. Variation remains a central theme. Such a focus on ecological relationships is at least implicit, if not explicit, in all of the contributions in this volume.

But what are we to make of this view of the environment in our effort to create a common ground for studying the past and present? We contend that anthropologists need to stress the role of production to a greater extent. What all groups share are sets of options about the use of available resources (Moran 1982, 1990). Production is quantifiable and thus provides an excellent comparative base. It is possible, for example, to discuss dairying in Ireland, Greece, and Cyprus in a comprehensive fashion if one has basic data on plot size and use, number and types of animals, levels of milk production, expenditures for feed, etc. In addition, such an approach lends itself readily to interdisciplinary studies. A proper ecological study requires information on soil types, hydrology, annual and long-term temperature and precipitation, physiographic features, the distribution of floral and faunal resources, etc. The anthropologist must place all of these factors within a cultural matrix, but the expertise of scholars from various disciplines lends great rigor to analysis. This precision makes cultural ecological studies potentially highly significant for policy implementation. We must stress again that such studies provide comprehensive explanations through careful consideration of variation, and avoid the circularity of old-style ecological

determinism. People are presented as decision-makers and players in the ecological dynamics of a region. We also wish to point out that people construct a conceptual model which contains rules and guidelines for social behavior and for the manner in which humans interact with the total environment (Allen, this volume). This model is flexible, and people mold it through successive decisions. A key concern for many contemporary cultural ecologists is the relationship between infrastructure and superstructure. We phrase the problem more specifically in terms of how productive factors affect negotiated boundaries of meaning. The latter shift to accommodate alterations in choices about the productive base.

Recently, Butzer (1996) discussed ecological studies in general and as these relate to the Mediterranean area. His point that modern ecosystems are the result of millennia of coevolution between environmental factors and human behavior is undeniable. He notes the four basic elements of Mediterranean agrosystems: "a) outfield cultivation of selected grains and legumes, suitable for local soils and climate; b) infield tending of various green vegetables and condiments...; c) orchard crops, not only grapevines and olive groves, but also other fruit trees; d) livestock, with sheep, goats or pigs" (Butzer 1996:142). One thing we would add to Butzer's list is the extraction of resources from uncultivated land (see Forbes, Clark, this volume). Butzer observes that farmers in this region carefully manipulated the various parts of this system in order to minimize risk and alleviate the vulnerability of particular plants or animals under certain conditions, i.e., they plan and act strategically. The long-term effect of such stewardship was the creation of an "artificial ecosystem that, on the whole, was sustainable" (Butzer 1996:146). We could not agree more and the papers in this volume provide ample support for Butzer's points.

Another theme we and others emphasize is the need to criticize the small but growing idea in some circles that people tend, over time, to destroy or at least seriously damage their local physical environments. We see the matter as an issue of operative boundaries. It seems that, given adequate physical control and time, the productive system and social system in a region are in sync with the overall environment. This set of relationships keeps the situation away from a climax environment. Cultures, in short, provide a diversity of energy systems; these do not all necessarily translate into fully balanced "green" environments, but the systems tend to be workable and sustain themselves (Butzer 1996:146). Human adaptive systems are not perfectly attuned to physical environments, but they do often develop long-term stable relationships. As Tobias (1968:208) noted, cultural "flexibility has largely ruled out the possibility of extinction through too narrow an adaptedness to a circumscribed biological niche."

Let us reiterate that these systems are not perfect, and in fact sometimes lead to cataclysmic conditions. Humans cannot control all factors, but most cultures develop some relatively stable relationship with the physical setting. Change does occur, but shifts in the environment are not necessarily negative. The importance

of anthropology is that it can provide case studies in the past as well as the present to illustrate these key points. Ethnographic work not only demonstrates in detail the nature of ecological relationships among contemporary societies, but it also provides the basis for models and analogies to comprehend the transformation of human response to the landscape through time. The recent debate about the viability of the four-field approach in anthropology seems to us to be a moot point; anthropology needs the integration of ethnography, archaeology, physical anthropology, and linguistics to deal with the intricate connections between human actions and the natural setting. In some ways, it is environmentally beneficial that people take a long time to change their social systems; the change requires shifts in rules and defined boundaries and creates a period of adjustment during which people develop a viable relationship with the physical environment.

Another concern is the broader web of connections among various cultures living in a variety of ecological settings. We suggest there is an ecological component to world systems theory (Wallerstein 1974, 1979, 1980) that requires much more study. While the economic aspects that most world systems scholars emphasize is certainly critical, the environmental factor needs greater attention. Among other things, world systems theory has demonstrated the significant degree of cultural interaction, especially in terms of trade, that occurred in the past among many cultures separated by considerable distances. It is necessary to translate this understanding of economic effects into a comprehensive study of change through contact. We should be more sensitive to the fact that few things and places are completely isolated; there are always impacts from the outside. Several scholars have recently discussed this issue (Crosby 1993; Larsen and Milner 1994), but more certainly needs to be said about this matter.

The Aegean region is in many ways an ideal location to explore the themes discussed above. Traditional scholarship in this region focused on philological analyses of ancient texts and the grand monuments of the Classical past. For years, anthropological studies in the Aegean also tended to be conventional in their focus on groups governed by overriding values, often within the confines of a peasant model which presented villagers as bound to custom, unyielding in their resistance to economic, political, and social change (see Campbell 1964; du Boulay 1974). Some scholars saw these traditional villagers as locked in a system that would inhibit economic development. In discussing land tenure systems, Campbell and Sherrard (1965) argued that the system of divided holdings, which assigned people small plots in a variety of topographic settings, unduly restricted productive capacity and limited Greece's economic expansion. Recent work has called these assertions into question. At the general level, Sutton (1988; van Andel and Sutton 1987) and Forbes (1976) in particular have demonstrated the flexibility of settlement systems and agricultural practices. These and other studies, following materialist and ecological principles, have demonstrated the wisdom of dispersed land holdings as a risk-reduction strategy in unstable times.

There has, in fact, been a flowering of environmental studies in the Aegean. Sallares (1991) has provided a monumental work on the relationship between ancient civilization and environment. Specific studies now abound, many of them outgrowths of the interdisciplinary regional projects that have become a mainstay of Greek archaeology (Bintliff and Snodgrass 1985; Davis et al. 1994; Jameson et al. 1994; Kardulias 1994; McDonald and Rapp 1972; Renfrew and Wagstaff 1982; Wright et al. 1990). In these collaborative efforts geomorphologists, soil experts, faunal analysts, palynologists, palaeoethnobotanists, and others have provided detailed discussions of the mutual impacts of humans and the physical environment on each other. One important issue that such scholars have addressed is the role of human activity in soil formation. Van Andel and his colleagues (Pope and van Andel 1984; van Andel et al. 1986 and this volume) demonstrate convincingly that people have had a significant effect on soil formation processes over the past 5000 years in the southern Argolid. They contend that a shift from agriculture to pastoralism, not uncommon at times of population decline, would have been far more devastating than complete abandonment of the terraced slopes. Sheep and goats dislodge stones from terrace walls and heavy winter rains complete the process; sheet erosion rapidly washes the soils downslope, denuding the hillsides and building thick formations in the valley bottoms. Under conditions of total neglect, *maquis* cover quickly reclaims the terraces and stabilizes the soils and may present a soil profile similar to that when farmers meticulously care for terrace walls.

A number of other studies demonstrate the innovative methods that Aegean scholars apply to issues of land use in the past and present. Romano and Schoenbrun (1993) have concluded a project in which they systematically surveyed the ancient city of Korinthos and its immediate environs. Their goal was to record all evidence for the Roman centuriation, i.e., the land division undertaken in the first century BC after Julius Caesar created the Roman colony of Korinthos. One of the remarkable discoveries was that the modern farm plots often follow the ancient pattern. It will be interesting to see how increasing mechanization and the shift to new agricultural products to meet the demands of the EEC market affects a land use pattern that has proven flexible and viable over a period of two millennia. Forbes (1976), Aschenbrenner (1986), and Gavrielides (1976) have examined land use in various parts of Greece. What their studies share is a clear ecological focus.

All of these archaeological and ethnographic studies demonstrate the fact that the environment as most broadly construed is a central concern in regional studies in the Aegean. For reasons different than those Herzfeld (1987) presents, we suggest that while Greece is geographically on the European fringe, many of the recent and current anthropological and environmental studies there not only incorporate the most up-to-date investigative methods, but also test a variety of techniques because of the extensive database available, including many archaeological reports and an enviable historical record. In addition, Aegean

scholars are more than consumers of theory and practices developed elsewhere. The many regional studies in particular have generated innovative techniques and expanded the interaction of scholars concerned with reconstructing past environments. In this sense, the core of anthropology can benefit from a close examination of work in a "marginal" area like Greece.

The present volume represents an Aegean book with an ecological focus, rather than vice-versa. This seemingly minor point is relevant in the context of Greek ethnography. There has for years been a general interest in ecological matters in ethnographic work written about Greece. Even the world historian McNeill alluded (1978) to such factors in explaining the transformation of Greek society after World War II. Few monographs or collections, however, have made an explicit statement placing ecological concerns squarely at the center of the study. The recent publication of results from the Keos and Argolid projects do so, but in those fine volumes archaeological concerns overwhelm other interests. The studies included in this volume stress both the ethnographic and environmental components. Just as archaeology in classical lands has opened new methodological and historical vistas for that subdiscipline, so, too, has ethnographic work in Greece forced scholars of the present to rethink or refine concepts about community structure, economic change, and the whole set of processes we subsume under the rubric "modernization", especially as these factors relate to people actively, even avidly, involved in adjusting to the environment (natural and cultural) which they confront on a daily basis.

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A 21st Century Approach to the Reconnaissance and Reconstruction of Archaeological Landscapes

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Introduction

Field-oriented archaeology in the Mediterranean has seen several significant shifts in methodology during the past few decades which may provide a hint of the direction fieldwork is going to take in the next century. One of the most important developments is the move from the big digs of prominent archaeological sites to short-duration, low-impact, intensive surveys of entire regions. Previously, archaeological excavations were often synonymous with gigantic field operations which could only be afforded by the richest nations. For instance, for the Rockefeller-funded excavation of the Agora in Athens, 365 buildings had to be demolished and 250,000 tons of earth were moved (Morris 1994:35). In terms of duration, archaeological excavations rank as the longest lasting field operations worldwide; Olympia, with 120 years of consecutive research, and Pompeii, with 135 years, probably hold the records. Despite their imposing size and duration, these projects are mainly directed toward examining the life and wealth of the highest ranking aristocrats of well-defined periods, classical Greece and Rome. In contrast, today more than two dozen intensive diachronical surveys are being conducted in Greece alone (Alcock et al. 1994:139). These projects are designed to determine the past as a whole, including the important interrelations between ancient civilizations and their environment. They are low-budget operations compared to excavations, typically designed to last for three to five years, but nevertheless dedicated to areas of up to 250 km².

Another development with major repercussions for archaeological fieldwork is the increasing involvement of natural scientists. Although zoologists, botanists, and anthropologists have long had a role in archaeological digs, recently the collaboration between the humanities and the sciences has acquired a new character. The point has been reached where landscape reconstructions no longer

just contribute valuable data for the pursuit of archaeological problems, but actually reinforce the merit and fate of entire projects (e.g. Jameson et al. 1994). In the past, target areas for excavations were determined subjectively by a one-man field check. Today, there are teams of remote sensing experts who employ an array of ground-penetrating equipment to locate potential archaeological sites. Due to the rapid technological development, new and revolutionary techniques emerge almost annually among the numerous scientific disciplines which contribute to our understanding of the past. Some of the most spectacular developments in current archaeological research, including the discovery of Ubar in Yemen (Aspaturian 1992) and the investigation of the glacier man (Spindler et al. 1996), are occurring with hardly any involvement of archaeologists.

But there is another side to this coin. Numerous scientific disciplines, using an array of both traditional and highly advanced technologies, have become involved in reconstructing the past, and it is often difficult to detect a central theme or coordination in their efforts. One inherent problem of the collaboration between archaeologists and scientists is the choice of methods and experts to be included in the fieldwork. The directors of archaeological projects—being archaeologists—cannot and should not be expected to know about the many different techniques that are available for the study of physical and chemical aspects of the site. What is more, their training usually does not permit them to establish which methods are most appropriate in a certain environment. Therefore, they may well end up inviting scientists whom they personally know, or who have acquired an outstanding reputation, no matter whether their expertise fits the problem set or not. The incompleteness created by this approach became evident at the conference on Biblical Archaeology Today 1990 during the session about scientific contributions to archaeology in Palestine (Biran and Aviram 1993: 489). It reminded one of the contributors, Steven A. Rosen, of an article by Karl Butzer published twenty years ago (Butzer 1975) bearing the title: “The Ecological Approach to Archaeology: Are We Really Trying?”:

I can only ask the same question here with respect to interdisciplinary studies in general. I cannot quarrel with the papers given here. In fact, I am sympathetic to the general tenor of all of them. But, let us classify them for the moment under the general headings of those aspects of interdisciplinary studies to which they belong...The range of subjects is remarkably limited and, in some senses, seems not to be interdisciplinary. Where is environment and climate? Do they not play a role in ancient culture and history? Where are physics and chemistry? The potential applications of these fields are so enormous that I will not even begin to enumerate. What about dating methods? What about botanical analysis? The list of what we have not heard is endless. The tools available to us for reconstructing the past are myriad. At the risk of preaching and sounding like a boor, if the above talks are a representative sample of the range of what we are doing in interdisciplinary studies, then we are not fulfilling our responsibilities to our own discipline. (Butzer 1975)

Whatever path the contribution of the physical sciences to archaeological problems may take in the future, the first goal will have to be the aim for more comprehensive studies, in the sense that all relevant aspects and methods are actually taken into account. The second goal, however, should be integration of the many disciplines involved in this pursuit. Today, archaeological monographs may contain individual and disparate articles with pollen diagrams, tables listing animal bones, descriptions of human remains, demographic developments, magnetometer surveys, climate charts, petrographic analysis and three dimensional landscape renderings produced by geographic information systems. Yet, apart from a few exceptions (Jameson et al. 1994; Wells et al. 1990), scholars have rarely tried to integrate the indisputably valuable information provided by the physical sciences with the results of archaeological research (van Andel 1994). The recent review of "Science in Archaeology," published by the *American Journal of Archaeology*, is characteristic of the current situation (McGovern 1995). Twenty-five individual authors contributed nineteen sub-articles bearing little or no relation to each other and neglecting the entire field of landscape reconstructions, including the contributions made by geoarchaeology, geomorphology, soil science, and soil micromorphology.

The third aspect of future reconstructions of archaeological landscapes could be labelled the "total coverage" of the study area. In the past, archaeological excavations tended to concentrate first on a palace and then—usually when the number of spectacular discoveries had decreased after many decades of fieldwork—gradually work their way outwards to explore the ground outside the citadel walls. Today, an array of remote sensing and prospecting techniques permit the investigation of entire landscapes irrespective of the location of known archaeological sites. As a principle, low resolution techniques and those which allow full coverage of the field area, such as remote sensing, should be employed first, because their results will indicate those smaller areas where high resolution techniques should be employed later on. The resolution is usually related to the distance between device and object and ranges from satellites at 700 km above the ground to micropalaeontological and palynological investigations in the submillimeter range.

The fourth aspect to be considered is that new and highly advanced methods are readily available and essentially waiting to be used for peaceful purposes. Among these techniques are the spectralphotometric thematic mappers on Landsat-satellites which allow a classification of the ground cover based on reflection signals (Finke and Malz 1988; Niemi and Finke 1988; Scollar 1990), the high resolution SPOT-images which permit the recognition of small scale topographic features, and the ERS-1 and ERS-2 radar satellites whose active transmitters produce ground-penetrating high-frequency signals. In addition, geophysical prospecting of archaeological sites is being conducted using magnetometry and resistivity (Allsop 1991). These new methods complement the

well established array of technologies thus far used in geoarchaeology, including subsurface borings (Hoffmann 1988; Zangger 1991, 1993a), soil descriptions (Pope and van Andel 1984; Timpson 1992) and pollen cores (Bottema 1982; Jahns 1993). Finally, archaeological sites often seem to have been considered as stratified accumulations of valuable artifacts which are both documents and assets of cultural achievement and therefore should be retrieved from the ground. In order to understand and reconstruct past societies, however, archaeology will have to pay as much attention to the mundane aspects of archaeological landscapes, including the location of field boundaries, pastureland, border lines, rivers, lakes, ports, canals, and irrigation and drainage systems, as it used to pay to the art historical aspects of past civilizations. This requires determining urban planning in prehistoric and early historic times—a field that is still very much in its infancy. Experts from diverse fields including geography, architecture, civil engineering, and hydroengineering are therefore needed on archaeological digs to determine the overall plan of ancient settlements. In order to understand ancient settlement patterns and to obtain holistic reconstructions of past environments—beyond the predominantly descriptive studies which have dominated in the past—future fieldwork will require a combination of the new approaches listed above with those that have been long established and successfully employed on archaeological digs. The purpose of this article is to present a strategy for such a high-technology, low-impact, short-duration study using technologies which are already available and involving scientists who possess the knowledge and devices required. This is not merely an academic exercise, however. The proposed project is a fully established task force which could be launched within a few days after government permission and funds are secured. Space restrictions have forced us to put the emphasis of this article on urban planning, remote sensing, and geophysical prospection, for these are less well known than the techniques of soil science, palynology, and geochemistry which are, of course, also major components of such a project (see Zangger et al. in press).

The Target Area

The proposed area of investigation is the Bronze Age city of Troy and its surrounding landscape. Troy is a highly suitable target for a holistic landscape reconstruction because it combines a well investigated archaeological site of considerable general and expert interest with a diverse landscape, including access to the sea at several places, coastal ridges and plains, man-made canals, and basin-like depressions. Although the project is designed so that it could be conducted at Troy immediately, the site only serves as an example. The same techniques could be employed anywhere in the Mediterranean and at many places

worldwide to reconstruct archaeological landscapes or to locate lost cities which are thus far only known from historical records.

The archaeological site considered to have been identical with the city described in Homer's *Iliad* is located on the Biga Peninsula in northwestern Turkey (N 39°55', E 26°15') on the southern shore of the western entrance to the Dardanelles. The palatial district of the city lies at the western end of an extensive Neogene peneplain-like spur on a mound called Hisarlik. The original height of the mound before excavations started must have been approximately 39 m above sea level (Easton 1990:Fig. 2). On its western and northern side the mound of Hisarlik drops into a coastal plain which covers nearly 70 km² with average elevations in its northern half between one and five meters (Kraft et al. 1982:14-15). The Aegean coast lies about 6 km west of the citadel and is separated from the floodplain by the 30-60 m high Yeniköy ridge. The Dardanelles are about 4.5 km north of Hisarlik. Much of the coastal plain in between formed during post-Bronze Age progradation caused by the deposition of floodplain alluvium (Kraft et al. 1982).

Probably due to its geopolitical position at the gateway between Europe and Asia on the one hand and the Mediterranean and Black Sea on the other, Bronze Age Troy was considered to have been one of the most influential cities in the history of occident and orient. If one is willing to accept ancient Greek textual sources as at least semi-factual, Troy must have been the subject of the best remembered military conflict in prehistory. Moreover, it is at the center of the oldest epics of western poetry and was considered to have been the mother city of the Roman empire. Even in medieval times Troy remained a focal point of intellectual interest.

Paradoxically, the city's reputation finally waned when its remains were discovered by Frank Calvert (Heuck Allen 1995) and Heinrich Schliemann in 1871 (Schliemann 1874, 1880, 1884). The first excavators felt the same disappointment that still today overcomes many visitors to the site. Relatively few architectural structures have remained and these are unimpressive compared to other archaeological sites in the Aegean. The excavations between 1871 and 1992 led to the impression that the glorified image of the former city, resting largely on oral transmissions, was completely out of proportion with the archaeological record (Bintliff 1991:97; Bittel 1976:138). Yet, in a series of articles and books published recently (Zangger 1992, 1993b, 1994, 1995a; see also Pullen 1994; Renfrew 1992) an alternative possibility has been introduced. It has been argued that a description of Troy stood at the center of a lengthy Egyptian text, now lost, whose contents were copied, translated into Greek, and transmitted in a slightly garbled form through aristocratic families in classical Athens, where it was finally written down by Plato around 360 BC (*Critias* 113c-121c). According to this new theory, Troy's millennia-old reputation would indeed have been well deserved. The discrepancy between the memory of the city and the results of archaeological fieldwork on the site simply occurred because

the latter was biased and too narrowly focussed on the royal citadel. If Plato's description of a magnificent lost city is indeed a recollection of Troy, however, the Bronze Age city must have differed from the image created by archaeological research in five aspects: (1) Troy had to be much larger than was thought until 1992; (2) it must have possessed complex artificial harbor installations; (3) it must have been surrounded by circular ditches; (4) it must have—at least temporarily—commanded considerable economic and military power; and (5) it must have been part of a thus far largely neglected Luwian civilization in western Anatolia which lay between the Mycenaean and Hittite states (Bossert 1946:iv; Zangger 1994:62).

Research conducted during the past three years has produced a wealth of information indicating that Plato's description bears more resemblance to the actual character of Bronze Age Troy than the image created after 120 years of investigations on the site. In 1992 and 1994 magnetometer surveys on the spur below the citadel produced two distinct anomalies (Becker and Jansen 1994). Both have already been excavated and were found to have been parts of circular ditches a few meters wide (Jablonka et al. 1994). The function and date of these ditches are not yet established; thus far they have been primarily considered to be obstacles for approaching chariots (Mannsperger 1995). The discovery of these trenches expanded the known parts of Troy by a factor of ten or more from c. 20,000 m² to at least 200,000 m² (Jablonka et al. 1994). This estimate does not take into account the existence of suburbs of considerable size all around the Trojan plain which may well have extended into the floodplain—areas which have never been subjected to careful archaeological scrutiny (Figure 2.1). This at least tenfold increase in the known size of Troy must, of course, be translated into increased political and economic power, too. The assumption that Troy was a cosmopolitan trade city of considerable political influence—rather than a "pirate's fortress" as was argued by the excavators (Korfmann 1986:13)—led to the first universal reconstruction of the events at the end of the Aegean Bronze Age (Zangger 1994, 1995a). Moreover, during excavations conducted in the summer of 1995 the first evidence of writing was discovered at Troy (Hawkins and Easton 1996). A sealstone dating to about 1100 BC and bearing a Luwian inscription reinforces the idea that Troy was part of the Luwian civilization in western Anatolia. What is needed now, beyond the stratigraphic descriptions of cultural and natural deposits by archaeologists and geoarchaeologists, is a reconstruction of the human habitat as a whole, which undoubtedly requires conceptualizing the urban planning of the past.

Past Urban Planning

The gist of past urban planning can be reconstructed following three principal approaches. The first one is based on texts. This avenue, however, is virtually

closed for the study of Bronze Age settlements, because of the lack of contemporary documents which discuss production and construction techniques.

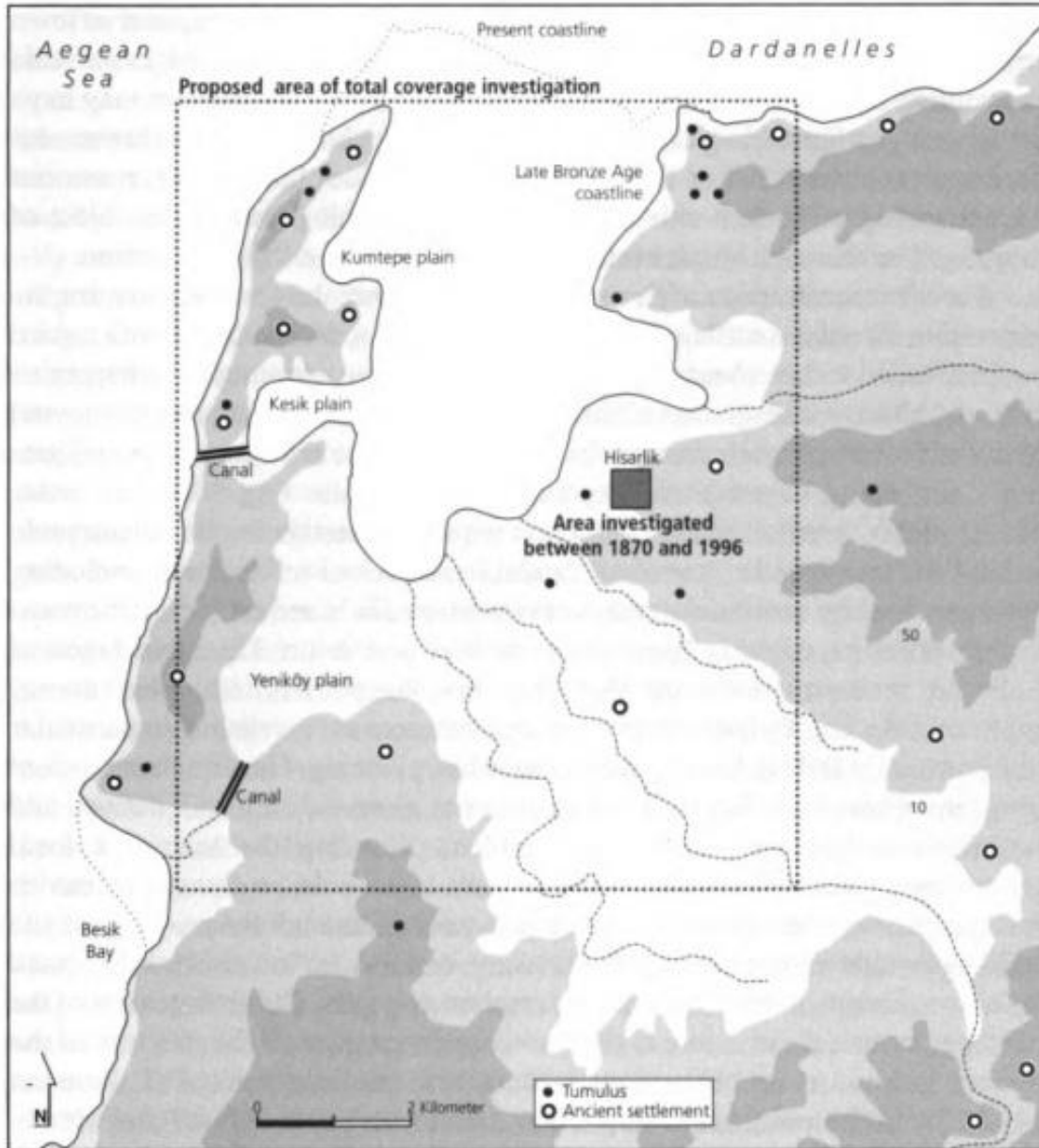


Figure 2.1. Map of the plain of Troy showing the size of the area on Hisarlik investigated thus far in relation to the area of the proposed total coverage. Numerous ancient settlements and tumuli indicate that this region was densely inhabited in prehistoric and historic times. Position of the Late Bronze Age coastline modified after Kraft et al. (1982:36).

The second approach, excavation, is the one that has been predominantly used in archaeology thus far. It works well when most of the architecture has been preserved and is revealed (e.g., Pompeii, Akrotiri, Trelleborg, Haithabu). Usually, however, only small parts of a town are still accessible. Important

components, including trenches, dams, and roads, have often been demolished during later construction or by soil erosion, and foundation walls have only remained where the building stones were neither destroyed by later and deeper substructures nor plundered for reuse. Moreover, even where expansive town remains have survived under the present surface, costs often prohibit large-scale excavations. Isolated excavations of cemeteries, temples and palaces may have the advantage of providing objective information about the cultural achievement during certain periods, but they yield few or no clues that help increase our understanding of ancient cities and past urban planning, unless the object of investigation has a schematic rectangular shape such as a Roman garrison.

For the reconstruction of Bronze Age cities neither the documentary nor the excavation record are sufficient; therefore, they have to be combined with a third method, called technical reconstruction. This requires assuming the perspective of the architects and engineers of the past to recover the most appropriate layout of the city—an approach commonly used to determine construction techniques (e.g., for the pyramids) and hydraulic installations (e.g., Roman water management). A technical reconstruction requires investigating the countryside around the town center. It uses all available sources of information, including those provided by documents and excavations, and is based on formulating and testing different working hypotheses by trial and error. The advantages of technical reconstructions are that they are inexpensive and ubiquitously applicable. Among their disadvantages are that errors are inevitable, in particular since relatively little is known about past urban planning. Nevertheless, ancient towns must have been designed to a large extent, since they are well defined and organized multi-purpose population centers providing the seat of a local government, places for religious meetings, courts, schools, stadiums, cemeteries and centers for artistry, craftsmanship and trade. Although the majority of the buildings within a town are used for housing, certain districts are also dedicated to the production, distribution and consumption of goods. The arrangement of the buildings reveals the structure of the society and vice versa: if the structure of the society is known, its urban development can be reconstructed (Leiermann 1994:11). In the past, towns and cities used to be better defined and clearly distinct from the countryside (see Allen, this volume). Until the French Revolution, city and country populations were even considered disparate; they followed different laws and were kept apart, often divided by massive fortification walls. Prior to the medieval period, town design was usually characterized by simple geometric patterns with rampart rings, squares and perpendicularly crossing main axes. Best known is the standard rectangular design of Roman cities that appeared throughout the Mediterranean area.

It is important to realize that urban planning consists of two essential components. The primary component includes water management (irrigation, drainage, sewage), food production (fields, gardens, agricultural terraces), industry (cereal and weaving mills, tanneries), and shelter (protection from

animal or enemy attack). These aspects have been of utmost importance for human communities since the first civilizations arose about 10,000 years ago, and people began to alter the landscape to their needs.

The secondary component consists of the architectural plan of buildings and their arrangement, which also serve a number of purposes, including the expression of power and wealth through exceptional architectural design and elaborate ornaments. Another purpose was religion, represented for instance by the many temples which survive from the past. The third function could be described as "rationale", because its main purpose was to serve certain aspects of daily routines (e.g., housing and commercial districts). Often these functions merged into each other, for instance when temples assumed colossal dimensions to express the power of the gods and of their mortal representatives. The expenses connected with redesigning and rebuilding a town, however, are so exorbitant that in most cases a rational approach was imperative. Rational designs are relatively easy to reconstruct, because they are determined by physical laws, and even towns which appear to have been chaotically designed must have been built according to certain schemes. If there was no functioning drainage, for instance, every heavy rainfall would have caused a disaster. Buildings for whose construction neither rationale nor expense mattered are rare curiosities in the history of architecture and usually have become major tourist attractions (e. g., Karnak temple, Schloss Neuschwanstein, Hearst Castle).

Since the primary and secondary components of urban planning are closely interrelated, they both have to be investigated to design or reconstruct a city. The primary component, however, is of paramount importance to the understanding of past communities, because it accommodates the most essential requirements of the urban population, including sustenance. Nevertheless, since the Renaissance, academic research has paid little or no attention to these aspects of urban agglomerations, and instead concentrated on studying the secondary component of urban planning only. As a result, much is known about the palatial residences of ancient aristocrats and very little is known about man-made landscapes (for exceptions see Gruber 1976; Koenig 1973; Neuburger 1919).

The ancient city of Troy is an excellent target for a technical reconstruction, because it was completely redesigned many times, each phase being indicated by Roman numerals, e.g., Troy VI, VII, and rebuilt even more often, indicated by lowercase letters, e.g. Troy VIa, VIb. Many aspects of the natural environment and its resources are likely to have been exploited during all phases of inhabitation (e.g., proximity to the coast, fresh water, mineral resources). Others, however, may have become of interest only during certain periods (e.g., secure pasture for horses). Like most successful cities, Troy's suburbs grew with time, following the topography and stretching across the gentle southern slopes where there is also shelter from northern gales.

Among the most important assets of the Bronze Age city must have been its ports. In previous years, the discussion about the location of the Bronze Age ports

of Troy concentrated on Besik Bay (Brückner 1912; Mey 1926), a sandy beach 9 km southwest of Hisarlik. The discovery of fifty-foot merchant ships such as the Ulu Burun wreck, however, is a strong indication that port installation must have eased peaceful long-distance trade (Raban 1990; Zangger 1995b). Under these circumstances, the sandy beach of Besik Bay appears to have been suitable as a contingency port at best. More appropriate for large-scale trading activities would have been a location on the western side of the coastal plain right at the bottom of the Yeniköy ridge, because this area provides much better shelter from wind, currents and enemy attacks. In May, 1991 surface investigations in the Kesik plain, a depression south of the classical city of Sigeum, led one of us (EZ) to the conclusion that this area would have been highly suitable for a Bronze Age port (Zangger 1992: 211). This observation was first made seventy years ago, but apparently subsequently overlooked or forgotten (Brückner 1925:12, 1927:12; Cook 1973:180; Mey 1926:14). The Kesik plain not only appears like a silted-up port basin, it also fits the description of an artificial port given in Plato's *Critias* (115D), especially since there is an impressive artificial trench, about 30 m deep and 50 m wide, connecting it with the Aegean Sea. Therefore, after 1991, the search for Troy's ports shifted from Besik Bay to the Kesik plain. Recent drill investigations have confirmed the existence of a marine basin there which is considered to have been "highly suitable" as a port (Kayan 1994), even though thus far no specific evidence has been found that it was used for such a purpose (Kayan 1995). This new proposal for the location of the Bronze Age port of Troy soon found the approval of ancient philologists (Luce 1995:211) and of the excavators of Troy who adopted it after some initial hesitation (Eberl and Romberg 1995: reconstruction on p. 25). The recent discovery of an artificial *cothon*-type port basin below the Late Bronze Age Palace of Nestor in southwestern Greece (Davis et al. 1995:342; Zangger 1995b:89; Zangger et al. 1997) further increases the likelihood that similar constructions existed at Troy. Preventing these basins from silting up required artificial dams, canals, and sediment traps to redirect clean fluvial water, producing a current that prohibited sedimentation. Such dams, canals and basins do exist at Troy. Although they may have been uplifted by recent tectonic movements, they still resemble well investigated port installations in Early Iron Age Palestine (Raban 1985, 1987, 1988).

The general picture of Troy held by archaeology for 120 years is no longer valid. The city was far bigger than previously thought, surrounded by circular ditches and most likely with complex hydraulic installations. Since the recent discoveries were largely due to hypothetical reconstructions and chance finds, the time has finally come to conduct a systematic investigation of the entire area between the Aegean coast and the mount of Hisarlik to determine (1) the precise extent of the former city, (2) the date and purpose of the artificial canals through the Yeniköy ridge and within the plain, (3) the character of the basin along the eastern side of the Yeniköy ridge, (4) the possibility that architectural structures

and other man-made installations might be buried below the floodplain alluvium, and (5) the possibility that well preserved artifacts and organic remains lie in the oxygen-free swamp deposits around the coastal plain. We consider such a systematic investigation to be the best—and perhaps the only—way to provide a solid foundation for the heated debate about the palaeotopography of the area (e. g., Bintliff 1991; Kraft et al. 1982; Luce 1984, 1995; Rapp and Kraft 1994; Zangger 1992).

Sky and Airborne Investigations

The first subsurface investigations of the Trojan plain were 1.5-2 m deep test pits dug by Rudolf Virchow (Schliemann 1880:147). These were followed after a gap of about one century by seven 30-75 m deep power drill holes produced in 1977 (Kraft et al. 1982). Although subsurface borings have been employed in many areas around the Aegean to reconstruct palaeocoastlines (e. g., Kraft et al. 1987; Zangger 1991, 1993a) and are considered an indispensable tool to define Holocene sedimentary lithosomes, the technique reflects the level of achievement that was customary thirty years ago. Since then numerous new methods have become available, in particular in remote sensing, geophysical prospection and data analysis, which ought to be employed to supplement the subsurface information obtained from drill holes. Therefore, to investigate the thus far unidentified suburbs and harbor installations at Troy, it would be best to use an array of different technologies at three levels of altitude (Figure 2.2): (1) Skyborne devices on satellites and on the Space Shuttle at about 700 km above the ground [supervised by a remote sensing team], (2) Airborne devices on planes and helicopters at 50-3,000 m above the ground [supervised by the sensing and a geophysical prospection team], and (3) Work on the ground [all teams except for remote sensing].

Usually magnetometry and resistivity meters are used on the ground, but our geophysical prospection team is also able to employ these techniques on a helicopter to obtain total coverage of the field area. The satellite-borne scanners and radar transmitters used by the remote sensing experts, on the other hand, can be installed on an airplane to obtain better resolution. Therefore, the efforts of both teams overlap in the airborne zone. Unfortunately they are not able to share the same craft, because the geophysical survey is conducted by a Sikorski-51 helicopter operating 100 m above the ground, whereas the radar investigation has to be done on a dedicated Dornier-228 airplane flying at 3,000 m altitude.

Two issues of paramount importance arise when using several different remote sensing techniques from space, planes and helicopters simultaneously. Firstly, all data have to be georeferenced to be comparable with each other. Secondly, a common database must be used to permit integration of the results. Airplanes and helicopters are therefore equipped with differential global

positioning systems which allow inflight geocoding. All the data collected during the sky- and airborne investigations, including the satellite images, can be read into a geographic information system (GIS) so that they can be cross-correlated.

Total Coverage	Skyborne	Satellite	SPOT LANDSAT-V TM ERS-1, ERS-2	Remote Sensing
		Space shuttle	SIR-C/X-SAR	
		Aeroplane	ESAR Optical sensor	
	Airborne	Helicopter	Magnetometry Electromagnetometry Scintillometry	Geophysics
		Geophysical prospection	Magnetometry Electromagnetometry Resistivity	
		Drill and auger holes	Geochemistry Palynology Chronometry	Geoarchaeology
Selected Areas 	Ground	Surface investigation	Geomorphology Soil science Urban planning	

Figure 2.2. Schematic diagram showing the various disciplines and methods involved in a systematic reconnaissance. Total coverage of the study area is only possible with instruments used from the air (or sky). Fieldwork on the ground has to be limited to selected areas. The geophysical prospection is conducted from a helicopter as well as on the ground.

Remote Sensing

The emphasis of the remote sensing research by the German Aerospace Research Center (DLR) lies on the evaluation of spaceborne and airborne collected Synthetic Aperture Radar (SAR) images. SAR is an imaging technique which allows very fine resolution in flight and across flight direction and has been developed mainly for military purposes. However, since the SEASAT-SAR

satellite was launched by NASA in 1978, SAR has also become a widely used remote sensing technique for scientific and commercial applications (Noack 1992, 1994). In 1991 the European Space Agency (ESA) launched the European Radar Satellite (ERS-1), which was recently followed by its successor ERS-2. These satellites are circling the earth in a polar orbit at 785 km. Each image collected by them covers an area of 100 x 100 km with a ground resolution of 25 m (Figure 2.3).



Figure 2.3. Image of the region around Troy and the Dardanelles produced by the European Radar Satellite (ERS-1) on 5 July 1993. The island of Imbros stands out left of the center.

In addition to ERS images, DLR may also use its airborne Experimental SAR (ESAR) facility, consisting of a multifrequency radar working in X-, C-, L-, and P bands with wavelengths of 3 cm, 6 cm, 24 cm, and 75 cm, respectively. This

high resolution ESAR system was developed and upgraded by DLR over the last few years and is the only system in Europe carrying a high penetration radar in the P-band. It is carried by a Dornier-228 aircraft designed for short takeoff and landings (STOL). The operating altitude for SAR acquisition is 3,000 m, with a speed of 252 km/h. The imaging swath is determined by the bandwidth of the electronics and the on-board tape recorders, but it is several kilometers wide and variable in size. The ESAR system possesses real-time on-board processing capability providing operators and users on the aircraft with immediate impressions of image contents and quality. Hence, if modifications or corrections to the mission plan are required, these can be determined and established during the flight. For the evaluation and interpretation of the images, a flexible high resolution processor and geocoding system is used later at DLR.

To support the team collecting *in situ* measurements in the field, a satellite link can be established to transmit the SAR-data to the research center in Oberpfaffenhofen, where specialists are able to process and interpret the radar images. The ESAR system is also used in an interferometric mode in which pairs of measurements allow the generation of digital elevation models (DEM) showing the topography of an entire region in three dimensions. These DEMs not only provide georeference data, but can also be used as a base on to which ERS-1 and ESAR images may be superimposed. The resulting scene has the quality of a topographic map and allows much improved interpretation of the data. Moreover, using the latest image interpretation tools like "Scene Understanding," it is possible to classify and distinguish modern and ancient structures and textures in the images, including rivers, channels and harbors.

Since radar is an active sensor, it might be used to penetrate clouds or to create images even at night, as opposed to LANDSAT and SPOT systems, which are passive optical sensors and depend on reflection of light. Under certain conditions, radar is even capable of penetrating the surface between a few millimeters and several meters deep, depending on the moisture of the soil and the frequency used. The many images acquired during the SIR-CXX-SAR Space Shuttle missions in 1994 have shown that the L-band is able to detect structures buried in dry sand; for example, buried fossil river beds in the Sahara desert. Since 1984, SAR has also been employed for archaeological prospecting in desert environments. Even the sand-covered caravan tracks leading to the ancient and legendary city of Ubar in Yemen could be located using space-borne radar technology (Aspaturian 1992). In 1992 and 1993 more than ten ERS-1 scenes were acquired from the landscape around Troy at monthly intervals. These images show significant differences in backscatter (gray value), depending on soil moisture and seasonal changes in vegetation and land use. Swamps and wetlands, as well as narrow links between them, appear as well defined dark zones. In addition to the radar instrument on the aircraft an optical multifrequency sensor allowing a resolution in the range of 25 cm could also be

employed. All processed data can be distributed to the scientists involved in the project by using the Intelligent Satellite Data Information System (ISIS) of DLR.

Geophysical Investigations

Much like remote sensing, geophysical prospecting on archaeological sites has the advantage of producing valuable information about subsurface structures for relatively large areas without destroying the context. During the past thirty years a number of geophysical methods have become available for use in archaeological research, including magnetometry, electromagnetometry, scintillometry, resistivity, and shallow seismic investigations. Previous work in southern France and Greece has demonstrated how useful magnetometry and resistivity are for tracing buried architectural structures. In Lattes (France) an entire Roman settlement was mapped without excavations (Fieberg et al. 1995; Kuhnke et al. 1989) and in Pylos (Greece) hitherto unknown structures of the Palace of Nestor were discovered (Zangger et al. 1997). At Troy, the extent and plan of the Roman settlement were determined by employing a continuously recording caesium magnetometer mounted on a carriage. The geophysicist who was in charge of these investigations, Helmut Becker, from the State Office for the Preservation of Historical Monuments in Munich, covered an area of over 20 ha south of the citadel in Troy during three seasons of fieldwork. Two major anomalies were detected using the caesium magnetometer, one of which has already been shown to be an artificial trench of Late Bronze Age date (Jablonka et al. 1994).

The ambiguity involved in the interpretation of plots generated by geophysical prospecting is directly related to the size, depth and signal strength of the buried object, the size of the measured area, and the resolution of the technique. In principle, it is imperative to cover large consecutive surfaces. To obtain total coverage of the field area a helicopter should be employed to cruise at altitudes of 50-100 m in regular flight paths 50-100 m apart. The helicopter belongs to the Federal Institute of Geoscience and Resources (BGR) in Hannover (Germany) and carries electromagnetometry (DIGHEM III), magnetometry (caesium-magnetometer), and scintillometry (potassium-jodid detector) devices providing a ground penetration of up to 15 m (Fluche 1994; Fluche and Sengspiel 1992). During data acquisition the helicopter cruises at 140 km/h. Since one mission usually lasts 2.5 hours, approximately 300 km of profile can be covered during each flight. If the flight paths are 50 m, the total flight distance needed to cover an area of 50 km² (c. 7 x 7 km) is 1,000 km. The helicopter bears electromagnetometry (rate=4/sec.), magnetometry (2/sec.), and scintillometry (1/sec.) devices and also records time, UTM-coordinates, radar altitude and barometric altitude. The difference between the two altitude measurements could be used as a record of the topography. The electromagnetometric measurements

are taken with an active dipole-dipole system of the DIGHEM III type. Three reading heads with different coil arrangements and frequencies are available for prospecting different ground surfaces and three frequencies between 330 Hz and 33 KHz are used to obtain different levels of ground penetration. The measured values represent the apparent specific resistivity of the ground which is a function of the soil material and moisture (Mommensen 1986; Scollar 1990). The results are produced as (1) frequency plots in map form of the apparent specific resistivity and the gravitation depth, (2) horizontal profiles of the apparent specific resistivity in relation to the ground surface or sea level, and (3) vertical profiles along the flight paths.

The total intensity of the magnetic field is registered by a caesium magnetometer with a resolution of 0.01 nanotesla (nT); the expected background is approximately 45,000 nT. Using correcting factors provided by the International Geomagnetic Reference Field as well as daily correction rates, a map of the total area showing contour lines or density plots can be generated. The data can also be shown in the form of profiles, which would help identify anomalous bodies. Since these techniques have been extensively employed for groundwater prospecting in developing countries, they are highly suited to scrutinize the port installations at Troy. They are likely to show buried trenches and architectural remains in the form of magnetic anomalies. By measuring magnetic profiles perpendicular to these anomalies and using sophisticated computer simulations, the depth, size and magnetic properties of the bodies causing the anomaly can be estimated (Zangger et al. 1997).

Scintillometry is particularly useful for tracing geological structures. Using this method the large discrepancy between the energies of artificial (keV) and natural (MeV) gamma radiation are measured. A very large sodium-iodine detector with a volume of 16.8 liters is used. The count rates of the gamma spectrometer are recorded up to 3 MeV in 256 channels. The interpretation of the results is usually limited to the natural isotopes of potassium, thorium, and uranium, as well as to the total radiation.

Based on the evaluation of the airborne prospection data, large-scale structures and anomalies can be identified. After the remote sensing and geophysical prospecting programs are concluded subareas on the ground are chosen, based on the information gathered from space and the air (Figure 2.4). Measuring then continues on the ground to produce high resolution images of anomalies detected from sky and air, but these investigations have to be limited to well defined subareas, because they are exceedingly labor- and time-intensive. Two methods used on the ground are a continuation of the work done from the helicopter. The magnetometry survey is conducted with portable gradiometers whose resolution and precision is around 0.1 nT. Thus far a 10 x 10 m area could be covered with an Overhauser gradiometer in about half an hour, using electronic data collection and one-meter spacing. Faster data acquisition is possible if the device is installed on a carriage that allows semi-continuous

readings. Several commercial inductive electromagnetometry devices are available to determine the apparent specific resistivity. In addition, we are planning to conduct resistivity measurements, because they have been shown to be particularly useful for the prospecting of archaeological sites. This technique is time-consuming, because probes have to be inserted into the ground several centimeters before each measurement is taken. Finally, we are investigating the possibility of using very low frequency resistivity and radio resistivity systems to obtain similar measurements with an inductive, and therefore much faster, method.

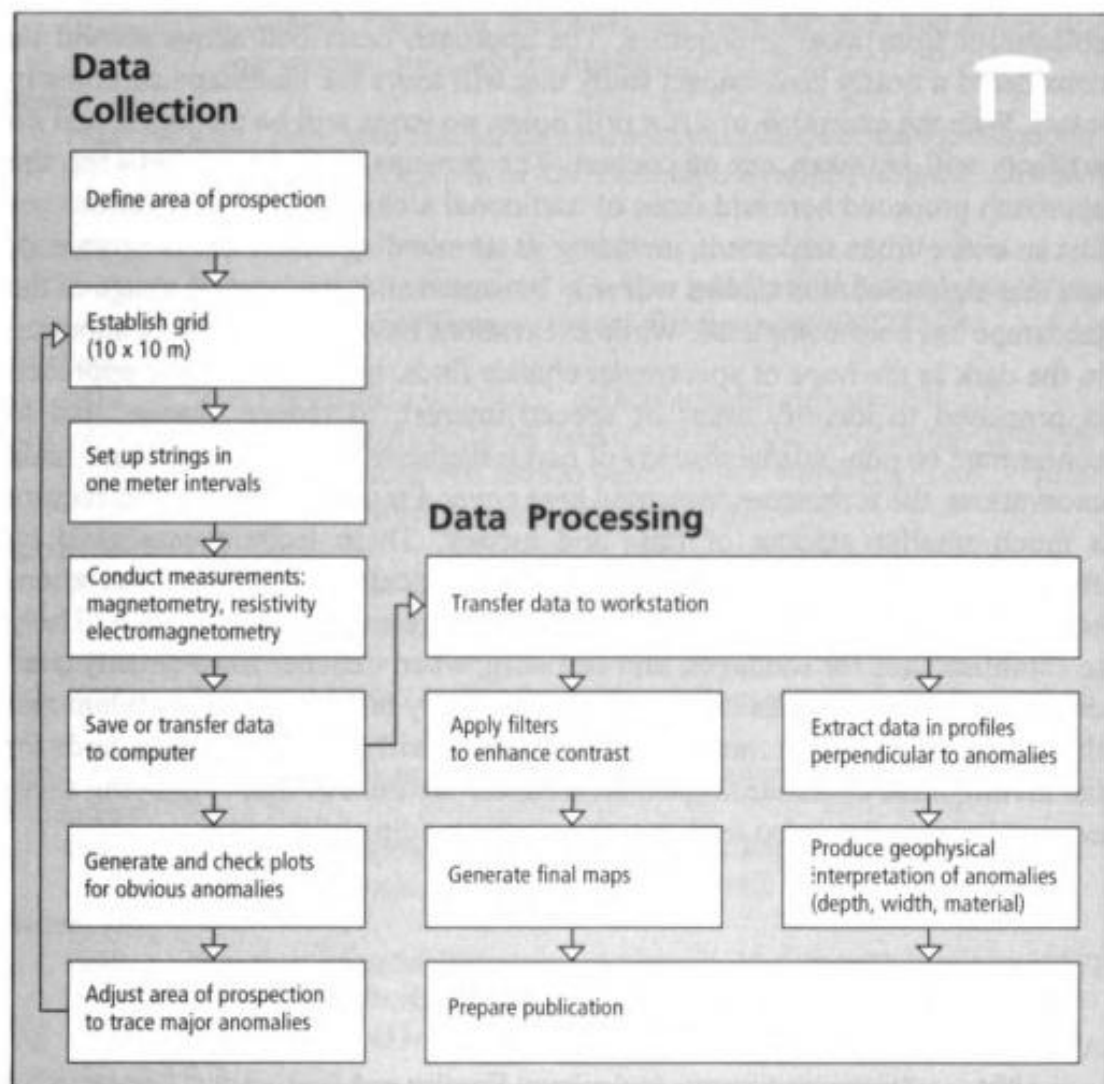


Figure 2.4. Flow diagram showing the twofold approach used during the geophysical prospecting of archaeological sites. The first part consists of systematic data collection in the field. In a second step, these are analyzed on work stations to determine the precise character and origin of magnetic anomalies.

Other Disciplines and Conclusions

Space restrictions have permitted us to describe only the research programs of the urban planning, remote sensing and geophysical prospecting teams. Equally important, however, are the efforts of soil science, palynology and geochemistry groups (see Zangger et al. in press). Descriptions of the techniques to be employed by these research teams as well as examples for their successful interdisciplinary collaboration in the field have been and will continue to be published in the framework of the Pylos Regional Archaeological Project in Messenia, Greece (Davis et al. 1995; Zangger 1995b; Zangger et al. 1997). Other teams, for instance in sedimentology and archaeology, should be directed by colleagues from local universities. The approach described above should be considered a nearly zero-impact study that will leave the landscape completely intact. With the exception of a few drill holes, no strata will be damaged, and no artifacts will be taken out of context. The principal differences between the approach proposed here and those of traditional archaeological excavations are that an entire urban settlement, including its surrounding landscape, is examined, and that high resolution studies will only be started after this general image of the landscape has been completed. While excavations have often been like shooting in the dark in the hope of spectacular chance finds, here a systematic approach is proposed to identify areas of special interest, to reduce chance, and to concentrate on non-palatial districts of past settlements. Compared to large-scale excavations, the techniques presented here cover a much larger area and require a much smaller amount of time and money. These techniques should be employed during the initial phase of an archaeological project before excavations begin, firstly because the data obtained by the physical scientific work will help to establish sites for sondages, and secondly, when trenches have already been dug, geophysical methods cannot be employed any more. We are confident that this kind of study, when carried to its conclusion, will establish new standards for the investigation of archaeological landscapes. We believe that employing these new techniques may also lead to a new understanding of the past.

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Five Thousand Years of Land Use and Abuse in the Southern Argolid, Greece

Tjeerd H. van Andel, Curtis N. Runnels, and Kevin O. Pope

Introduction

Greece is, in the main, a land of dry and barren mountains, poor in fertile, well-watered soil. Still, ancient authors refer repeatedly to the wooded hills and rich bottomlands of a remote past. Whether the disappearance of this lush landscape, if indeed it ever existed, was due to natural or to human causes has been debated with passion since Antiquity. Environmentalists of a pessimistic bent like to cite the eastern Mediterranean as a particularly horrifying example of what callous human disregard for the environment can bring about, while others have attributed the stripping of soil from the mountains to the severe climate of the Pleistocene.

The Argolid Exploration Project

In 1979, Stanford initiated an intensive archaeological and environmental survey of the Southern Argolid (Ermionis), directed jointly by M.H. Jameson and Tj. H. van Andel. This project was designed to elucidate the prehistoric and historic evolution of a geographically well defined, environmentally diverse rural Greek region (Figure 3.1); it built upon many years of exploration and some surveying in the Southern Argolid by Jameson and T.W. Jacobsen, as well as on excavations of Palaeolithic through Neolithic deposits at Franchthi Cave (Jacobsen 1976, 1981) and at the Archaic and Classical polis of Halieis (Boyd and Rudolph 1978; Jameson 1969, 1974). A geological study of the late Quaternary landscape (Pope and van Andel 1984) and a marine geophysical survey of the postglacial transgression and associated coastal environments (van Andel and Lianos 1983, 1984) formed an integral part of the project.

The geological study had two main objectives: (1) to determine the types of soils with which archaeological sites were associated and to assess the possible loss of sites due to erosion, burial by sediment, or inundation by the sea, and (2)



Figure 3.1. The Southern Argolid in the Peloponnese, Greece (insert: black square). Streams are dashed. the topographic contour interval is 100 m. (from Greek topographic maps of scale 1:5,000).

to develop the history of soil formation, slope erosion, and valley and coastal plain alluviation in response to natural (e.g. climatic, tectonic, sea-level) and human factors, primarily agriculture and pastoralism.

Beginning in 1960, Claudio Vita-Finzi developed a general model of the late Quaternary alluviation history of the Mediterranean region. This model envisaged two stages of alluviation, the Older and Younger Fills, each followed by a period of stream incision (Vita-Finzi 1969). He placed the Older Fill, identifiable among other things by its full red color, late in the Pleistocene, and assigned the brown-gray Younger Fill to a late Roman (ca. AD 400) to early Modern date, attributing

both to climatic causes. His model has been widely cited in Mediterranean archaeology but has lately drawn fire from studies that have shown the twofold alluviation scheme and the chronology to be too generalized to reflect reality or to permit a constructive analysis of the causes (e.g., Davidson 1980; Raphael 1973; and especially Wagstaff 1981).

We therefore used the opportunity afforded by the Argolid Exploration Project to examine in detail the chronology of landscape stability and destabilization, the varying nature of the deposits, and possible correlations of both with the prehistoric and historic trends which emerged from the archaeological survey. We found a sequence and timing of events that differed significantly from the Vita-Finzi model, and the causes we deduced for the Holocene alluvia emphasize the activity of man more than that of the climate. We note at the outset, however, that the conclusions elaborated below apply directly only to the Southern Argolid. Detailed studies in areas with different human histories and environmental settings must assess whether there is more than local merit to our views.

The Archaeological and Geological Surveys

Field work was conducted during four seasons from 1979 to 1983 with the goal of investigating the changing patterns of human settlement and land use in the context of the history of the natural landscape, i.e., the human paleo-ecology of the Southern Argolid (Butzer 1984). Details of the method and results of the archaeological survey are discussed in Runnels (1983) and Runnels and van Andel (forthcoming) and in greater detail in Jameson et al. (in preparation).

The survey area approximately coincides with the eparchy of the Ermionis, an area of 225 sq km south of the Aderes and Didima ranges. Previous explorations and a reconnaissance survey in 1972 by an Indiana University and University of Pennsylvania team under the direction of T.W. Jacobsen, M.H. Jameson, and J.A. Dengate (University of Illinois at Urbana-Champaign) had revealed the presence of numerous archaeological sites; we verified as much as possible their locations, ages and properties during the 1979-1983 survey.

The territory in its entirety was too large for complete coverage, and in any case some parts were not open to survey because of the destruction or inaccessibility of traces of the past in towns, industrial or resort areas, or on land of uncooperative owners (Figure 3.2). Given the limits of our time and resources, it was necessary to restrict the intensive survey to about 20% of the total area. We rejected probabilistic approaches, although admittedly ideal in principle, as neither feasible nor taking proper advantage of pre-existing knowledge. Instead, we chose a sampling scheme guided by environmental considerations and a guarded use of previous information. We selected about ten separate tracts, emphasizing representative geomorphological and environmental settings, and avoided steep, barren slopes, although we inspected all ridge and crest areas. In

addition, we paid special attention to the surroundings of the excavated sites of Halieis and Franchthi and explored at least to some degree each of the small drainages of the region. Altogether, about 44 sq km (*ca.* 20%) of the Ermionis were covered in an intensive manner, while the areas omitted from the intensive survey were inspected by special teams in a more expansive fashion.

Each survey tract was laid out on a Greek topographic map (scale 1:5,000) and surveyed by field walking teams of at least five people spaced 5-15 m apart. By this procedure we detected sites as small as 12 sq m. A site was defined as "a concentration of cultural materials with a recognizable boundary". Furthermore, in order to be considered "primary" the site had to show evidence that the cultural materials were coming from a buried context. Material from each site was collected by means of random sample squares of transects, as were all other diagnostic or "feature" artifacts. Some 319 sites were located and sampled.

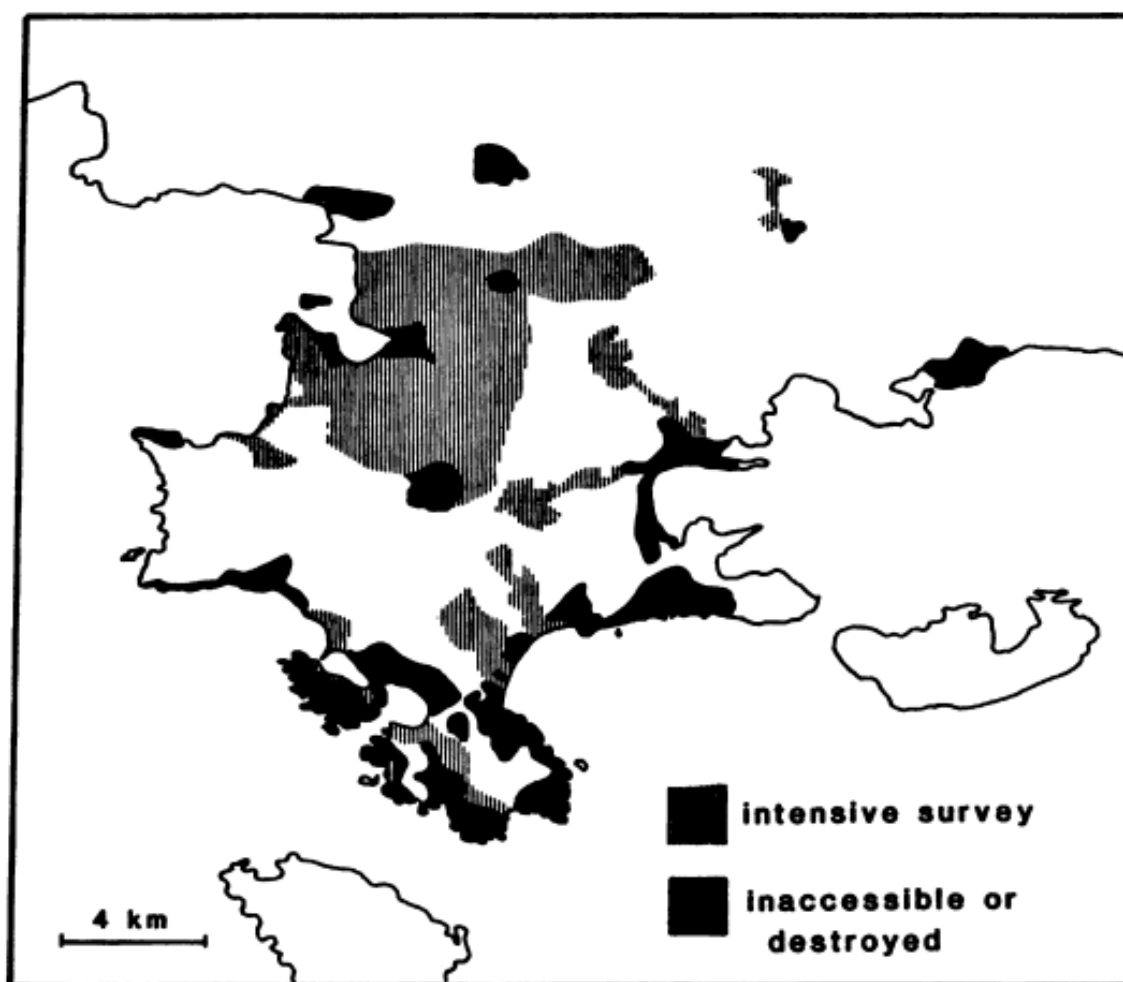


Figure 3.2. Areas surveyed intensively and extensively during the Argolid Exploration Project.

Discovery and identification of sites may be impeded by burial under later deposits, although erosion, plowing, and burrowing often bring cultural material

to the surface, but fortunately this was of small concern in our area. Less than 5% of the region is covered by Holocene alluvium, and those deposits tend to be thin and much incised. Much land exposed during the Upper Paleolithic is now under sea (van Andel and Lianos 1983), but the post-glacial rise of the sea has slowed, and a coastal zone measuring a mere 7% of the present land was inundated since the Neolithic.

The geological study, having for its objective the landscape contemporaneous with human settlement, was primarily oriented towards late Quaternary deposits and events. For practical purposes, those beds not affected by the last phase of tilting and faulting (Dufaure 1965, 1977; Dufaure et al. 1979) were assumed to constitute the late Quaternary sequence. Those deposits are restricted to narrow coastal plains and to the floors and lower slopes of the valleys in the many small drainages of the region (Figure 3.3). We also examined and mapped all remnants of old soils, now found mainly on the rolling hills of the southern peninsula and in the Fournoi valley.

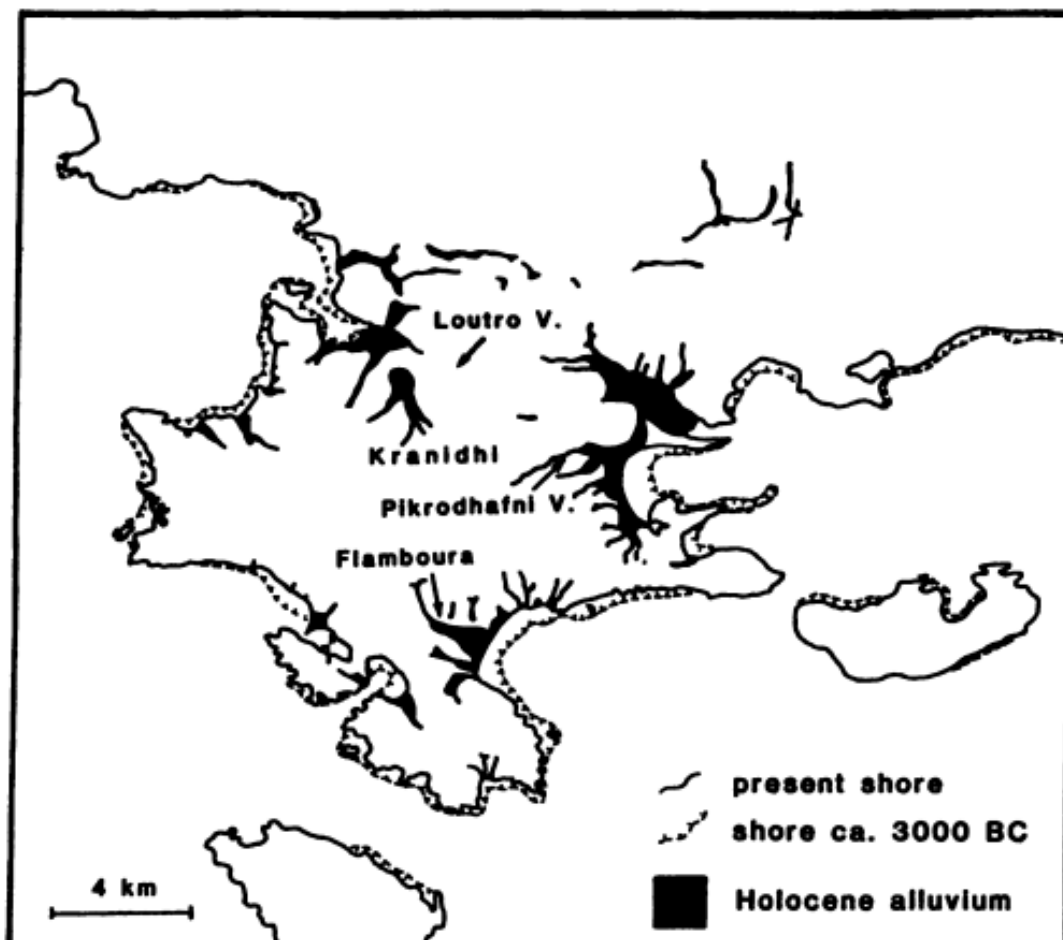


Figure 3.3. Areas covered with Holocene alluvium (shaded). Between dashed and solid coastlines lies that part of the shore zone which has been inundated by the sea in the last 5,000 years. Place names indicate type locations of late Quaternary alluvial units (see Figure 3.4).

In the semiarid climate of the Southern Argolid, streams are seasonal except where fed by an occasional perennial spring. At present most are deeply incised in the deposits of earlier alluviation phases or in bedrock. Active deposition occurs in only a few places, such as the lower Ermioni valley and the few coastal lagoons.

The geological survey combined aerial photo analysis with a detailed field examination of all drainages to construct geological maps on a scale of 1:5,000 on which all archaeological sites identified by the survey teams were entered. In most valleys, several phases of alluviation could be recognized, but the discontinuous and highly variable deposits do not allow us to distinguish older and younger units with confidence unless they are superimposed, nor do they easily permit correlations from one valley to another (Butzer 1980). Between phases of alluviation, however, soils formed (Figure 3.4) whose properties depend on their maturity and so can be used to correlate across the region and to estimate the approximate age of the deposits (Birkeland 1984:194-224; Harden 1982; Morrison 1976).

Using associations with buried soils, the characteristics of those soils, and such features as stream terraces and fan lobes, a sequence of deposits was established for each drainage, and the individual sequences were correlated across divides by means of paleosols. More precise age estimates than those based on soil properties were needed, however, to provide the fine chronological resolution demanded by our archaeological objectives. Artifacts contained in the alluvia, mainly potsherds, provided a date *post quem*, sites superimposed on them a date *ante quem* for individual stratigraphic units. Although both dates may differ considerably from the actual time of deposition, by good fortune several of the Argolid stratigraphic units were closely bracketed in time by archaeological data.

Units deposited prior to the Bronze Age usually lack artifactual material, nor do they contain in this area charcoal and wood suitable for radiocarbon dating. We succeeded in establishing the ages of some of them with thorium-uranium disequilibria determined on dense calcium carbonate nodules from the calcareous horizons of the paleosols (Ku et al. 1979; Ku and Liang 1983; Pope et al. 1984). At the opposite end of the time scale, historical data have sometimes been helpful, especially the geomorphological features shown on Venetian cadastral maps of the early eighteenth century (Topping 1976).

Although the chronological base (Pope and van Andel 1984, table 3) is less ample than we would have liked, it is adequate to place the alluvial and soil units in a stratigraphic scheme suitable for our purpose. The dates do not demonstrate perfect synchronicity between events in individual valleys, but, taken over the whole peninsula, they set the useful limits on their onset and end.

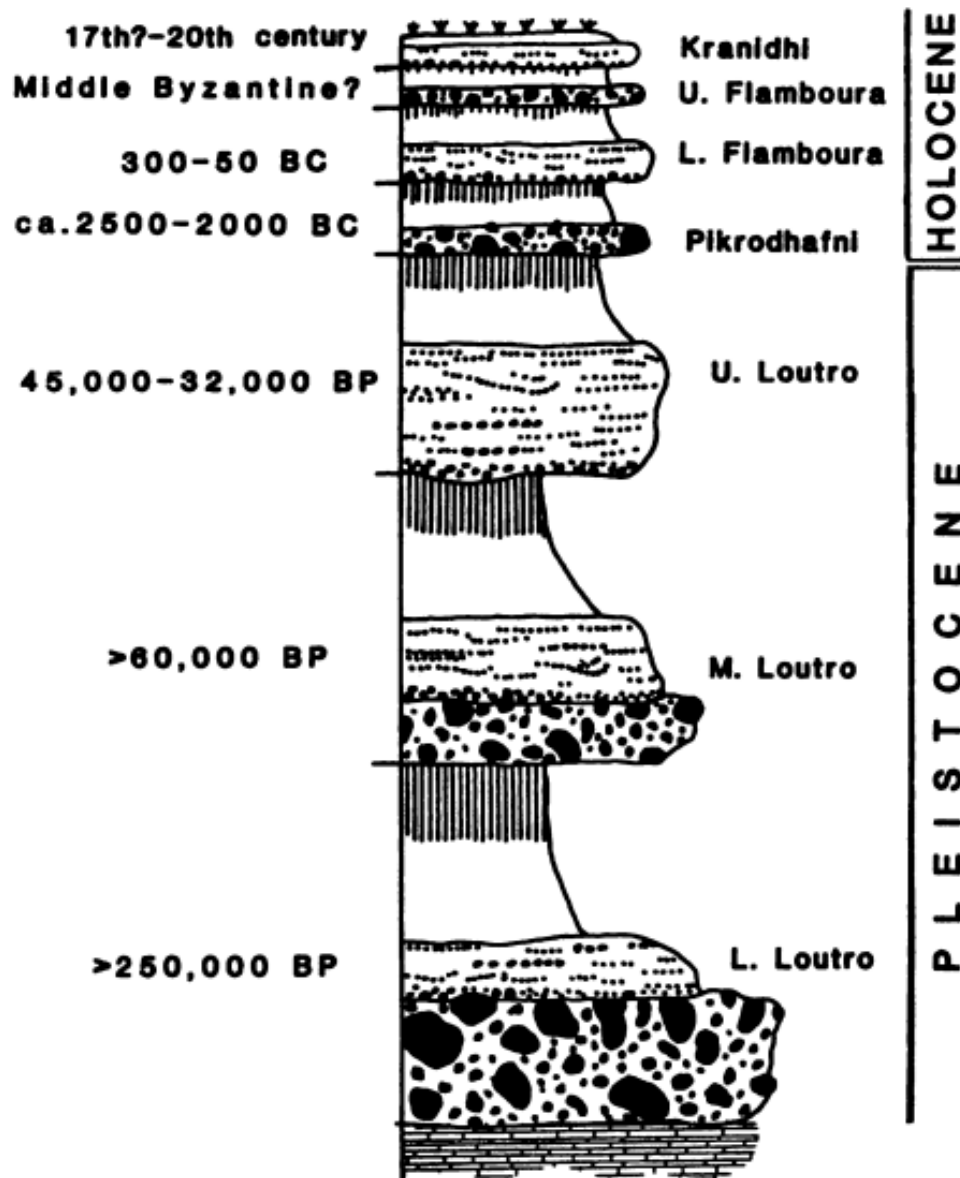


Figure 3.4. Sequence of late Quaternary alluvial deposits and intervening soils with their approximate ages. Chaotic mass of large boulders represents debris flows; stratified gravels are stream-flood deposits. Intervening blank zones are overbank loams with soil profiles (vertical shading proportional in length to the degree of soil maturity). Units displayed in approximate proportion to their average thickness.

Alluvial Deposits and Sequence of Events

Seven alluvial events can be recognized in the late Quaternary deposits of the Southern Argolid (Figure 3.4). They are separated by intervals of landscape

stability during which soils formed; only the last unit is too young to possess even incipient soil.

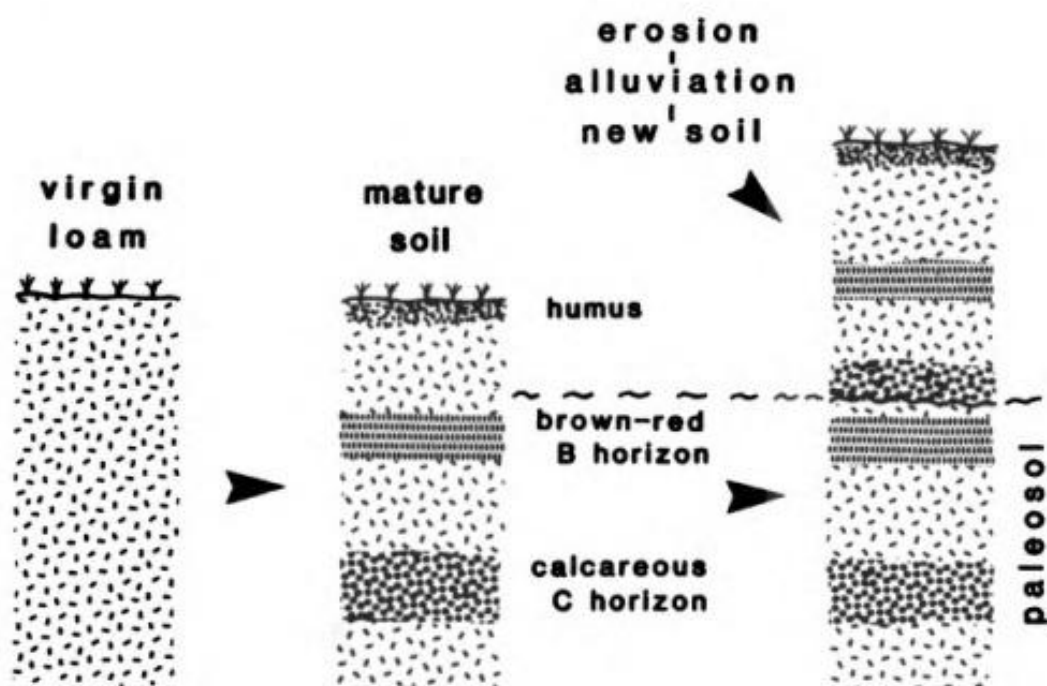


Figure 3.5. Soil formation in a semiarid climate. Profile at extreme right shows erosion resulting in loss of top soil, followed by deposition of new alluvium and formation of another, less mature soil.

Commonly only the B and C horizons (Figure 3.5) of the old soils have been preserved. The B horizon is characterized by an intensification of color to reddish brown and red, by the deposition of pedogenic clay, and by the formation of a blocky soil structure (e.g. Birkeland 1984:118-152). In the C horizon, calcium carbonate is deposited, beginning as scattered flakes but evolving to hard nodules and eventually calcareous banks (e.g. Leeder 1975; Wieder and Yaalon 1982). These processes are slow, and well-developed soils require thousands of years of landscape stability (Birkeland 1984:194-224; Harden 1982). Alluviation, on the other hand, is a quick process; local dates allow a mere 250 years for the formation of the Lower Flamboura and a few decades for some examples of the Kranidi unit (Pope and van Andel 1984). Evidently, the geomorphic history of the Southern Argolid has been one of long periods of tranquility irregularly broken by brief events of slope destabilization and valley alluviation.

With decreasing age, the alluvial units decrease markedly in thickness (Figure 3.4) owing to a gradual reduction in slope mantle available for erosion and to an improved chance of preservation. This suggests that the sevenfold scheme may be incomplete and that some alluviation events, especially of the Pleistocene age, may no longer be represented.

It also indicates that the denudation of the slopes of whatever soil mantle they may have possessed took place mainly during the Pleistocene, the volume of soil erosion having been relatively unimportant during the last 5,000 years. We have estimated elsewhere (Jameson et al. 1994) that postglacial erosion has removed a soil volume equivalent to a layer covering the whole area to a depth of less than 70 cm. A separate estimate for the southern peninsula which consists of softer, more easily eroded bedrock shows removal of about 100 cm, in contrast to less than 40 cm for the hard limestone ranges in the north. Evidently, the barren aspect of this part of the Peloponnese is largely due to the ravages of Pleistocene climate and sea-level changes and only to a lesser degree attributable to human carelessness.

The erosional and depositional processes that formed individual alluvial units can be inferred from the nature of the sediments themselves (e.g. Patton and Schumm 1981; Picard and High 1973). Three depositional types (Figure 3.6) can be distinguished in the semiarid alluvial deposits of the Southern Argolid. The first are the debris flows, chaotic beds of illsorted, largely angular boulders, cobbles, and pebbles, surrounded and supported by a matrix of finer material (Bull 1972, 1977; Hooke 1967). Sheet erosion of weathered slope mantle forms debris flows which are often deposited catastrophically as thick, water-rich slurries (Innes 1983). In the Southern Argolid, some debris-flow deposits blanket an entire valley floor with a single unit several meters thick. Sheet erosion becomes possible when the slope mantle is rendered vulnerable by a reduction in the plant cover due to prolonged drought, fire, or clearing.

Stream-flood deposits are formed during flood stages in braided channels and on bars (Miall 1977; Rust 1978). The stratified sediments consist of lenticular beds of fairly well sorted gravel and sand. In this case, it is increased runoff concentrated in gullies rather than sheet erosion that enhances down-cutting and sends a large sediment load downstream. One possible cause is an increase in precipitation not immediately compensated by a denser vegetation.

The most common alluvial deposit is a sandy overbank loam, often with thin pebble layers. This loam forms slowly and intermittently on valley floors and coastal plains during flood stages and also constitutes the distal parts of alluvial fans. All alluvial units in Southern Argolid terminate in overbank loam which carries the soil of the postdepositional interval of stability.

In addition, the late Quaternary has extensive colluvium, i.e., slope-wash deposits, ranging from gravels to loam, and areas of old deep soils formed on bedrock. Judging by their present distribution, these autochthonous soils formed mainly on the Cenozoic marls and shales of the southern peninsula and on an igneous complex known as ophiolites, common in for example, the Fournoi valley and on the Iliokastro plateau. No remnants of these deep autochthonous soils have been found on the steep limestone slopes of the north, nor on the youngest Cenozoic mudstones and conglomerates in the extreme south where soil development was apparently thin. Although significantly eroded, enough remains

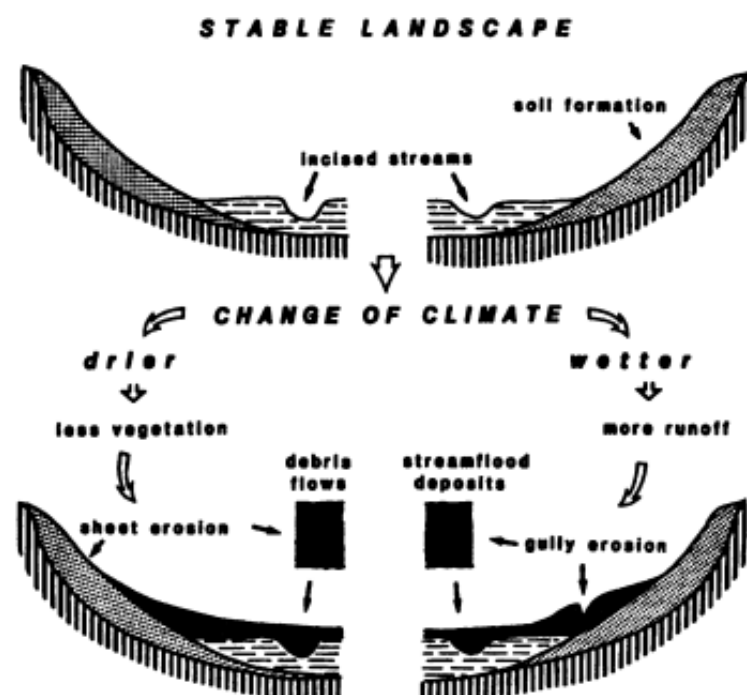


Figure 3.6. Diagram of destabilization of slopes by climate change in a mature landscape where soils form and streams are incised. Drier climate leads to reduced vegetation (land clearing may do the same), sheet erosion of slopes, and the deposition of debris flows. A wetter climate (or neglect of existing terracing) leads to gully erosion, concentrates runoff, and produces stream-flood deposits.

of the old, deep soils to reconstruct their early and middle Holocene distribution, before extensive human use began (see, for example, Figure 3.8).

The three main alluvial facies occur in various combinations among the several stratigraphic units. The Pikrodafni and Upper Flamboura and Kranidi are stream-flood deposits, thus demonstrating that the forces disturbing the stability of the landscape have varied with time.

The final Pleistocene alluviation (Upper Loutro: Figure 3.4) was followed by long stability, the more remarkable because it spans the high glacial, postglacial climatic optimum, and part of the subsequent gradual climatic deterioration. Then, about 4,000 years ago, began a series of thin but widespread alluvia separated by relatively brief periods of quiescence, the first arriving about a thousand years after the initial spread of settlement across the peninsula. While the causes of the Pleistocene alluviation are undoubtedly to be sought in climate and sea-level changes (Pope and van Andel 1984), the coincidence between the sudden Holocene increase in the frequency of alluviation events and the spread of settlement forces us to consider human causal factors.

Settlement Patterns, Soils, and Soil Erosion

The earliest traces of human occupation in the Southern Argolid date to about 50,000 BP (Pope et al. 1984), and the Franchthi cave site was settled at least since the Upper Paleolithic (Jacobsen 1976), but settlement elsewhere in the Southern Argolid remained exceedingly sparse (Figure 3.7) until the Final Neolithic (FN) when, some time during the 4th millennium BC, expansion across the peninsula began. The principal site at Franchthi was abandoned or left to shepherds and their flocks, and the number of sites, now scattered widely across the peninsula, rose from 2 confirmed ones in the Late Neolithic to between 7 and 13 FN sites, and to 28-32 by the Early Helladic (EH) II (Figure 3.8). With few exceptions, the FN and EH sites cluster on or near the deep autochthonous soils, apparently avoiding areas where such soils are now, and probably always were, thin or absent.

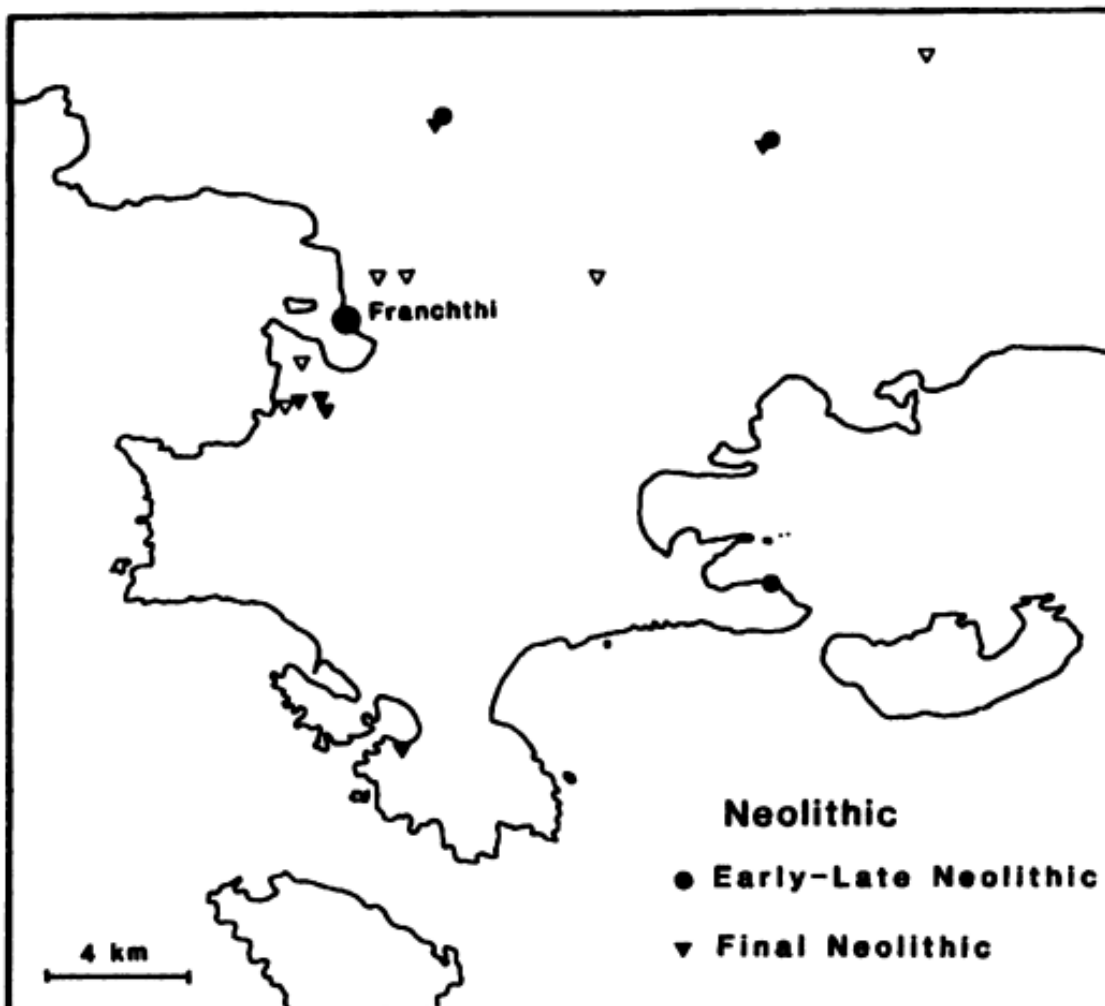


Figure 3.7. Early through Late Neolithic sites in the Southern Argolid are few, but expansion into new lands begins in the 4th millennium BC. Filled symbols indicate sites of confirmed age; open ones mark probable ones.

Previously, these lands were probably covered with a moderately rich, open wood- or parkland of deciduous oak with hornbeam, beach, and holly (e.g. Rackham 1983). Sparse pollen data from Thermisi lagoon in the Southern Argolid (Sheehan 1979) suggest that remnants of this woodland still lingered in the area around the middle of the 3rd millennium BC, even though much clearing would by then have taken place.

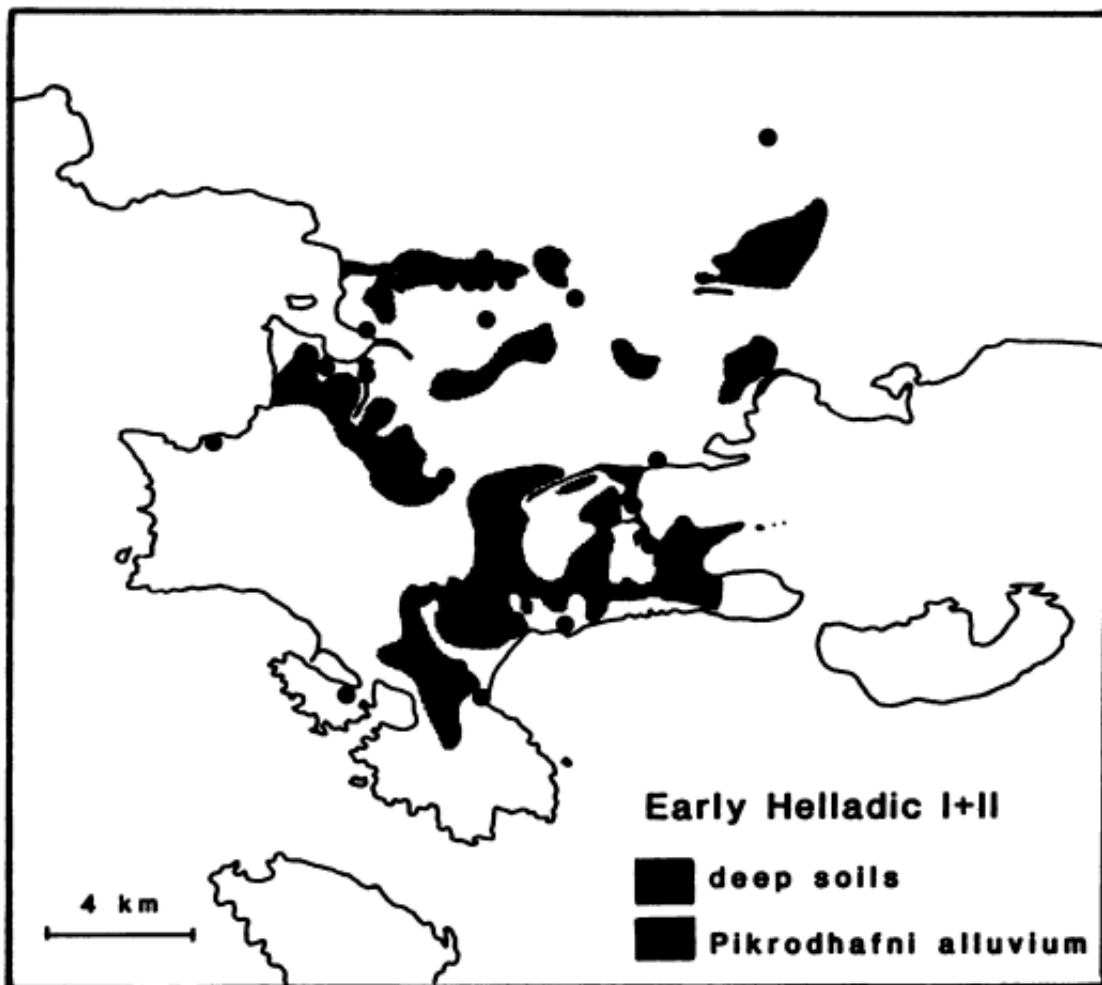


Figure 3.8. Distribution of Early Helladic I and II sites relates closely to old, deep soils (shown here and in Figures 3.9 and 3.10 in their reconstructed original extent). Pikrodafni alluvium of late 3rd or early 2nd millennium BC is found mainly downstream of clusters of sites and is attributed to catastrophic soil erosion resulting from intensified land use without soil conservation. Only sites of confirmed age are shown on this and all following maps.

During the 4th and early 3rd millennia we encounter no evidence that the spread of settlements and clearing of the land had a destabilizing effect on the landscape, but ultimately damage was inevitable. The Pikrodafni alluvium, broadly dated by its content of EH I and II sherds and the presence of a Late

Helladic (LH) site on top, has a soil-maturity level consistent with an age of about 4,000 years, and an analogous unit in the Argive plain is more narrowly bracketed by EH II material within and EH III sites on top. The Pikrodafni is found only in valleys where FN and EH I and II settlement was extensive, and its deposits consist mainly of debris flows. The individual flows formed essentially instantaneously but need not have been synchronous across the entire peninsula.

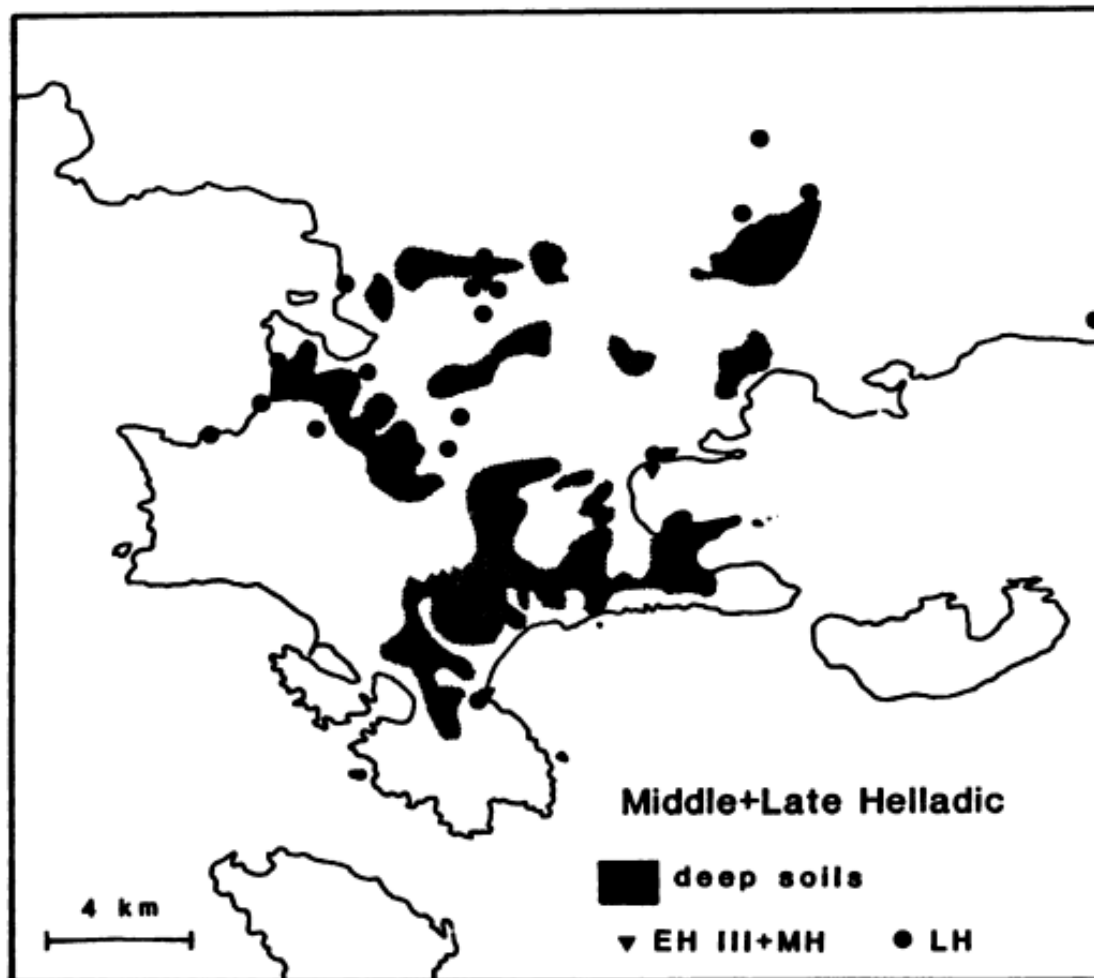


Figure 3.9. Sparse Middle Helladic sites imply reduced pressure on land, but Late Helladic expansion returns to the old, deep soils exploited since the 4th millennium.

The EH III period brought a sharp drop from 28 confirmed sites to only 2, rising but slightly to 5 in the Middle Helladic (MH). A major expansion to 27 confirmed and 10 probable sites took place in the Mycenaean (LH) period (Figure 3.9). It would be rash, however, to attribute the EH III decline to the soil erosion documented by the Pikrodafni, because political or economic disturbances were widespread at this time in the whole Aegean region (Caskey 1960; Rutter 1979). Moreover, although substantial damage was no doubt

incurred, especially on some of the valley bottoms, the remaining deep soils continued for millennia to provide the principal local agricultural base.

What were the causes of such extensive erosion arriving so late during the first major agricultural expansion in the area? Destabilization of slopes accompanied by valley alluviation takes many forms (Bell 1982; Butzer 1974). Settlements themselves disturb vegetation and soil and concentrate rainfall and runoff, thereby accelerating erosion. Bare rocky slopes can be seen at present below such hilltop villages as Kranidi; the dislodged sediment forms a distinct apron in the plain. Prehistoric examples are provided by the row of EH I and II sites on the hills south of Koilada Bay; established to exploit the deep upland soils of the hill tops, the sites themselves are now on bare bedrock.

The soils of the gently rolling hill country of the southern peninsula and of the ophiolites of the Fourni valley and Iliokastro plateau, mainstays of agriculture during the 4th through 2nd millennia BC, are not especially vulnerable to erosion even without deliberate attempts at soil conservation. Evidence for this is the relatively large area of deep soil still remaining after 5,000 years of exploitation. In the semiarid climate of the eastern Mediterranean, landscape stability is naturally maintained by the vegetation (e.g., Naveh and Dan 1973), and even after a major disturbance *maquis* and pine woods will quickly establish a protective cover provided that the disruption by burning, brush cutting, or overgrazing does not continue too severely. We have seen terraces bulldozed into steep slopes of shale which, having been abandoned after failure to deliver the expected yield, had become fully protected by a dense growth of *maquis* within a decade or so.

Therefore, a system of long fallow, with plowed fields scattered between larger areas left untended for many years, would present little risk of major soil erosion, because *maquis* would swiftly colonize fallow fields, as pollen data indeed indicate (Sheehan 1979). Occasionally, a few years of exceptional rains in the summer when the plant cover is most fragile might induce sheet erosion, but otherwise the risk of soil erosion would only gradually increase as growing population pressure led to shortening of the fallow and exploitation of progressively steeper slopes.

Whether caused entirely by increasing intensity of exploitation or aided by temporary shifts in the rainfall pattern (for which geological evidence would be hard to find), the Pikrodafni event demonstrates the eventual failure of the EH agriculture to contain the loss of soil. That renewed expansion during the LH did not invite a similarly disastrous response, even though the same soils and slopes were exploited, demonstrates that the lesson had been learned well.

The traditional approach to soil conservation in the Aegean, and throughout much of the Mediterranean, is the construction of stone walled terraces on slopes and stone check dams across gullies and small streams. The system is not only effective in reducing erosion but actively stores soil behind the terrace walls. Kept in good repair, terraces and dams virtually eliminate sheet and gully erosion,

but the soil reservoir which gradually accumulates behind them is delicately perched and metastable. Once that reservoir is set in motion by any breaching of its walls, erosion is rapid and difficult to contain. Although an excellent soil conservation method, terracing exacts its price by the need for unceasing maintenance (Forbes and Koster 1976).

Terrace walls appeared in the Levant during the later 2nd millennium BC, associated with the culture of the olive (Gophna 1979). In Greece, they have been used since at least Classical times, but few walls so old or older have been identified, and the date of the technique is not known. We have, however, seen behind an old terrace wall the occasional soil profile that appeared to be only slightly less mature than the Pikrodafni soil and hence might date to the 2nd millennium BC. Mycenaean engineering, adept at the construction of fortresses, roads, bridges and retaining walls, was certainly up to the task.

Whatever the soil conservation techniques may have been (although terracing appears to us the only plausible candidate), they were eminently successful, because no further trace of alluviation is found for the entire period of Mycenaean prosperity. Not even the collapse at the end of this period and the major subsequent abandonment of the area shown by the apparent absence of eleventh- and twelfth-century sites have left any mark on the landscape. The reason must surely be the rapidity with which, upon abandonment of large tracts of land, the natural vegetation takes over. Kermes oak, pistachio, wild pear, broom, and other shrubs normally edge all but the most meticulously kept terraces, and their roots hold the mass of soil firmly in place after the stone walls themselves have fallen away. Terraces long deserted but perfectly preserved by this means can be seen all over the Argolid. Moreover, *maquis* colonizes the terrace surfaces within a few years, impeding serious erosion.

The first resettlement of the Southern Argolid dates to the tenth century BC or after, but the recovery was slow and did not accelerate until the later eighth century. Settlement reached a maximum of 78 confirmed and 32 probable sites in the later fourth century BC (later Classical and Hellenistic periods). First reoccupied were the old deep soils, mainstay of traditional cereal agriculture, but with the fifth century a major expansion began onto the thinner, stonier and often steeper soils of the Pleistocene Loutro alluvium, as well as onto the Late Cenozoic conglomerates and mudstones of the southernmost peninsula (Figure 3.10). Many small sites were placed near steeply sloping land that could not have been used without terracing, thus providing further evidence that this had become the common mode of soil conservation. Elsewhere we have argued (Runnels and van Andel forthcoming) that the main force behind this expansion onto more marginal lands was an increase in cash cropping, especially of olive, for external markets.

This development carried with it high environmental risk, and the consequences were not long in coming. Beginning in the third century BC, the Greek and Aegean worlds experienced a lengthy economic decline, and

settlement in the Southern Argolid was sharply reduced, remaining thin until the third century after Christ (Figure 3.11). Wholesale abandonment of fields in the Hellenistic and Early Roman periods is reflected in a major increase in *maquis* pollen in the sediments of coastal lagoons (Sheehan 1979) and in soil erosion which produced the extensive deposits of the Lower Flamboura, as regards soil conservation a depressed rural economy may be far more damaging than total economic collapse.

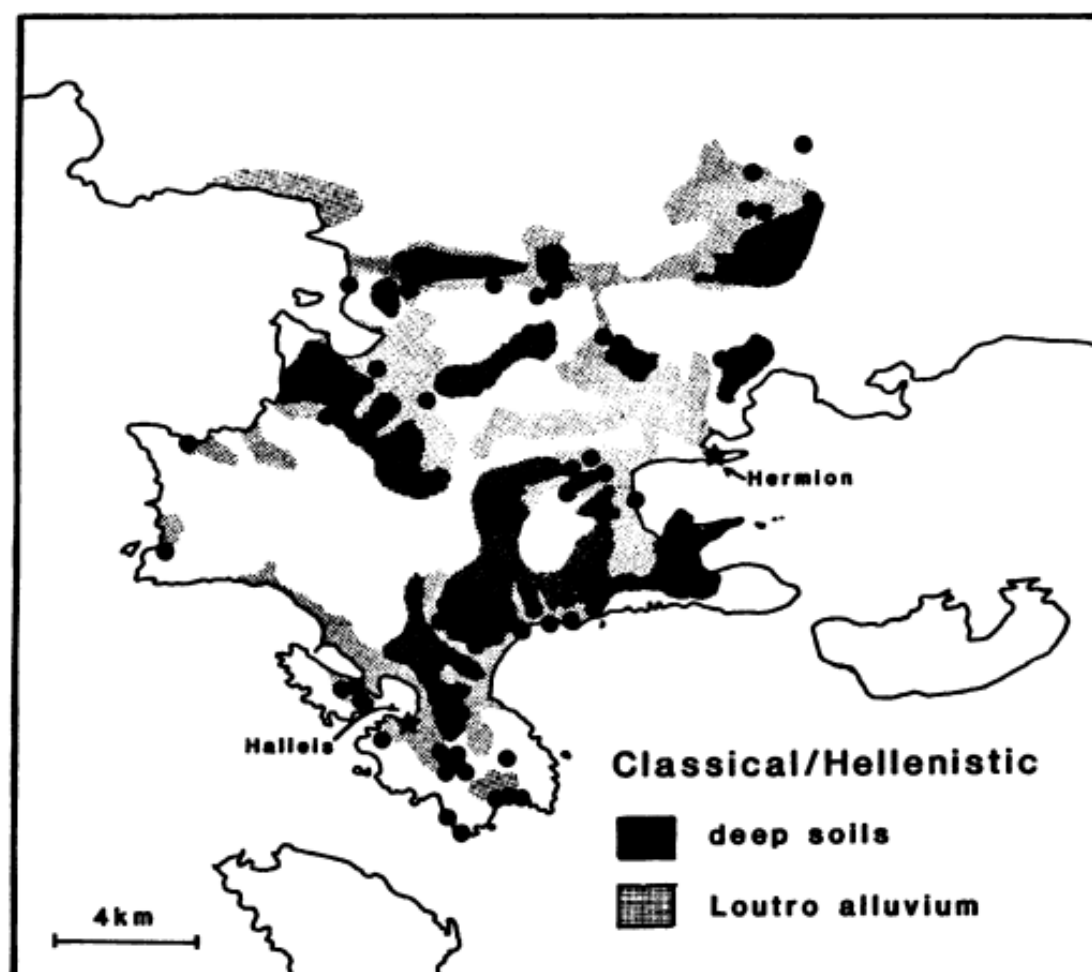


Figure 3.10. Large expansion of Classical and Classical/Hellenistic sites continues to exploit old, deep soils but also extends to coarser, less favorable Loutro alluvium (lighter shading).

During an economic downturn, the upkeep of agricultural terraces, especially when distant and on marginal soil, is seen as not cost-effective over the short term (Jameson 1977-78), and the farmer will tend to redirect his efforts to better more centrally located fields. A small continuing benefit may, however, be extracted by harvesting some olives and especially by turning the fields over to

grazing by sheep or goats. This practice, common in the off-season in times of prosperity also, requires considerable effort by the shepherd to ensure that terrace walls and land are not damaged, an effort less likely to be made when the interest of the landowner has so obviously lessened.

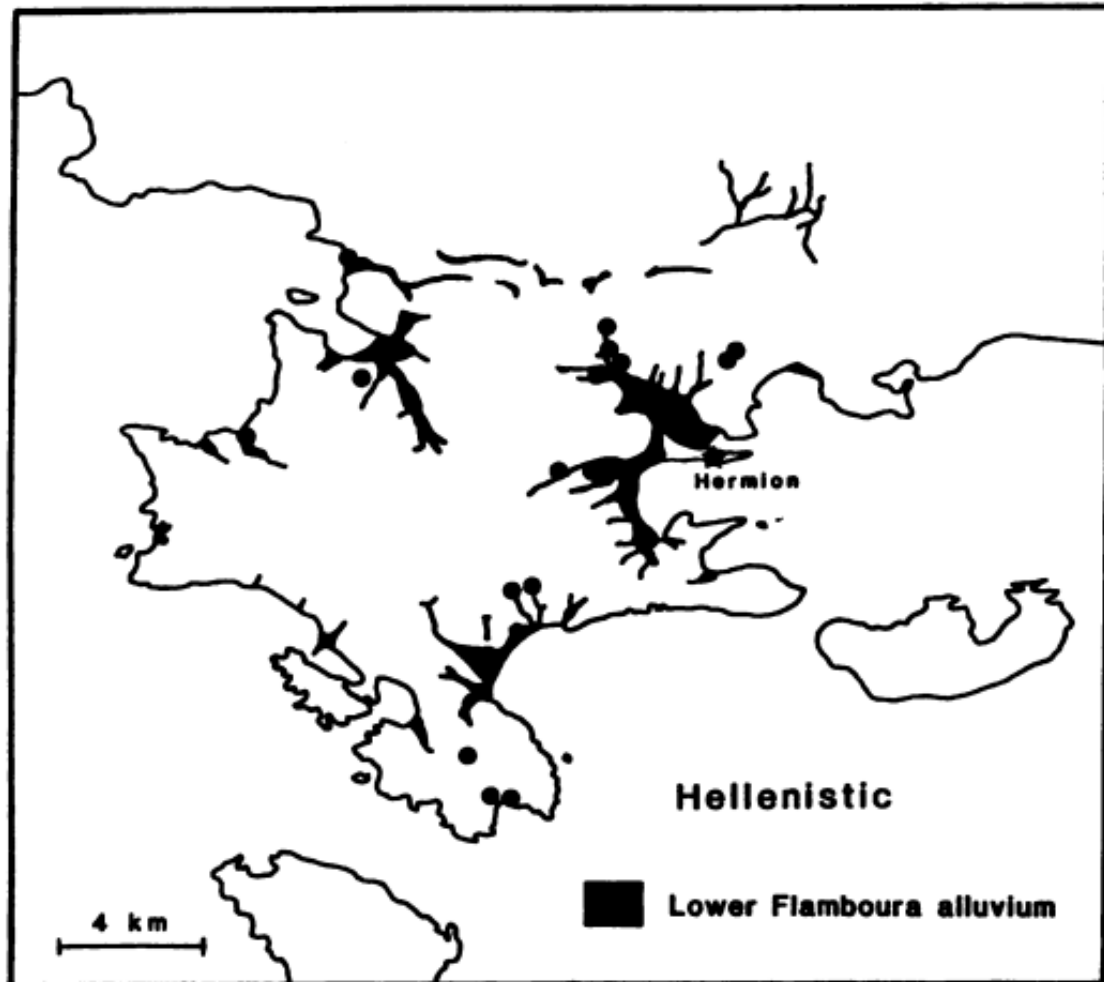


Figure 3.11. Considerable reduction in number of sites due to economic adversity takes place during Hellenistic and Early and Middle Roman periods. Neglect of terrace walls is thought to account for the deposition of the extensive Lower Flamboura stream-flood deposits late in the first millennium BC.

When the shepherd ceases to control his flock with brush barriers and no longer repairs any damage they may have done to the walls, two things happen that are serious and eventually fatal to the soil accumulated for centuries behind the walls. Sheep and goats wander across those walls, kicking down stones and creating trails soon excavated by the winter rains into gullies, which branch within the deposits behind the walls and rapidly remove the soil. The increased and concentrated runoff swells the small streams and spills across check dams, undercutting them until they collapse. Very rapid vertical erosion is the result.

We note that, unlike the fine quality of prehistoric hydraulic engineering seen in some other parts of the world (e.g. Donkin 1979), check dams in the Southern Argolid tend to be poorly constructed without proper spill over rims and splash basins. Moreover, owners appear to prefer the freedom to schedule work that comes from repairing rather than preventing damage and to accept the limited soil loss that normally results.

The consequences of neglecting maintenance while pastoralism continues are swift. In a small valley south of Koilada, intact terracing is evident in aerial photos taken in 1961. In 1979, few walls remained, slopes were strewn with boulders, soil erosion was obvious from exposed tree roots and fallen trunks, and 40 cm of alluvium had accumulated in the bottom of the valley. Today, this process, observable elsewhere in the area, is usually not due to economic stress from, say, lost markets but rather to a redirection of the landowner's interests away from subsistence agriculture and towards tourist industry or sale of land, but the results are always the same.

Gully erosion concentrates runoff and increases stream flow, thus enhancing the deposition of stream-flood sediments which make up the Lower Flamboura. Of course, the same stream-flood deposits could have formed if runoff had been increased by a change towards a wetter climate. This unit is narrowly dated to the Hellenistic period, however, by Classical and Hellenistic sherds within the deposits and Hellenistic and Late Roman sites on top (Pope and van Andel 1984, table 3), and there is no independent evidence for a climatic change at that time. Neglect of soil conservation thus appears to be the best explanation of the event.

We are fortunate that alluvial history of the Southern Argolid contains more than one example of each of the postulated relations between land use and soil erosion or stability, thereby presenting us with a partial test of our reasoning.

Beginning in the third century after Christ a strong economic recovery took place in parts of Greece, including the Southern Argolid, a recovery which continued into the fifth and sixth centuries. Sites of this date are numerous (Figure 3.12), many of them reoccupying abandoned Classical and Hellenistic sites. The preference for old, deep soils, Loutro alluvium, and for the southernmost peninsula also harks back to Classical and early Hellenistic times. The alluvium deposited during the time of retrenchment apparently held little attraction, perhaps because it was not yet old enough to possess adequate soil development, something which holds true for the Kranidi alluvium today.

The expansion also involved lands not cultivated before, including some steeper slopes of the headwaters of the Ermioni and Fournoi rivers, but the pace of development must have been deliberate, and care was taken with soil conservation, impeccably restoring old terrace walls and dams and constructing new ones, because the landscape remained perfectly stable throughout.

Unfortunately, prosperity did not last long, because the barbarian invasions, beginning in the third century, increased markedly towards the end of the sixth and upset the economic stability of much of the Eastern Roman Empire. We have

no evidence for sites in the area after the early seventh century, and once more pine and *maquis* become evident in the pollen spectra of coastal lagoons (Sheehan 1979), protecting the soil effectively against erosion.

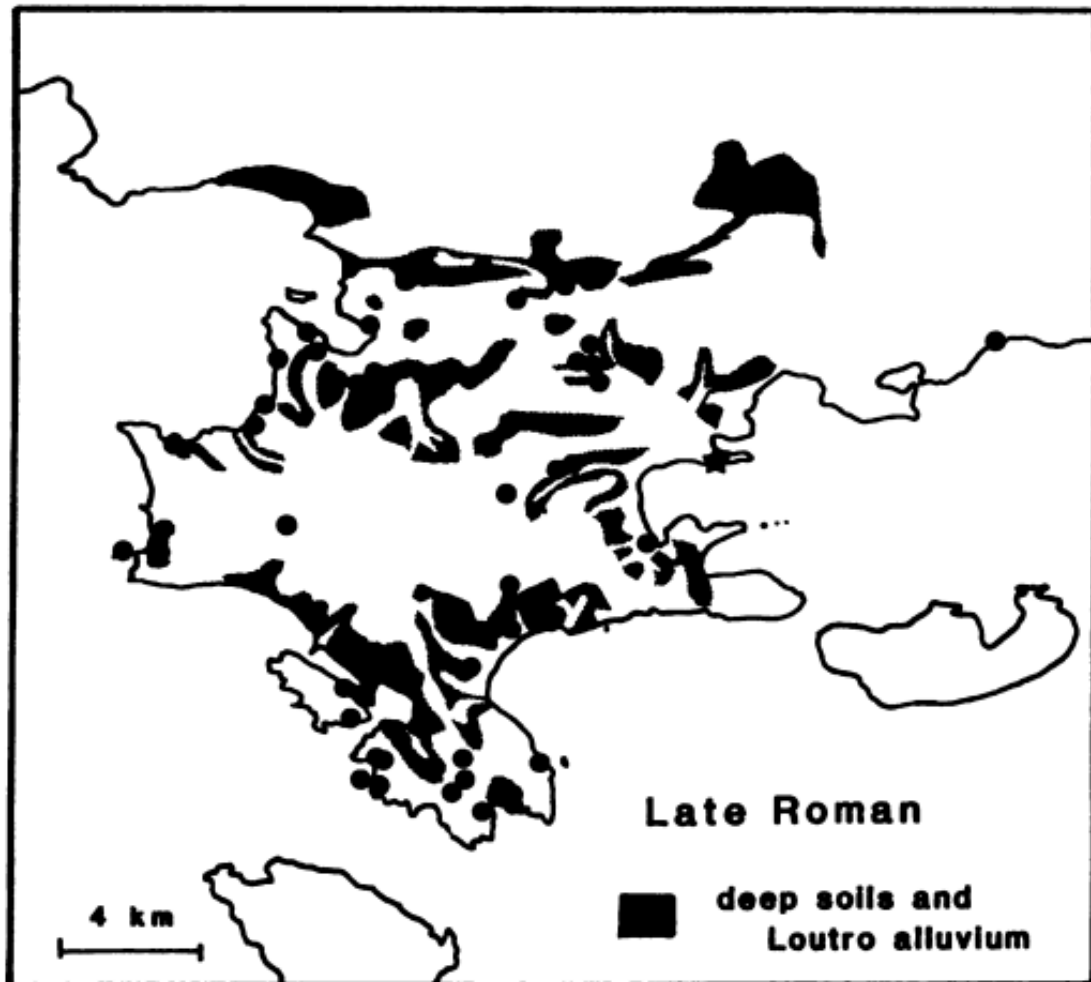


Figure 3.12. Renewed expansion, beginning in the third century after Christ, had no impact on slope stability and alluviation, being apparently accompanied by adequate soil-conservation measures. Deep, old soils (shown here in their present extent because of the severe losses during the Lower Flamboura erosion) and Loutro alluvium drew most sites.

Not until the ninth century after Christ or later was Byzantine authority restored in the area, allowing settlers to return. They built their small hamlets and chapels in the headwaters of such valleys as those of Ermioni and Pikrodafni (Figure 3.13) but shunned the shore. Kranidi on its ridge was probably founded at this time, with an excellent view of the sea but safely away from the coast. The exception was the former Classical town of Hermion (modern Ermioni), rebuilt and fortified to provide an outlet to the sea and the external world. The southernmost part of the peninsula was left uninhabited.

The new farmers, perhaps not familiar with the methods of soil conservation traditional to the area, were much less careful than their Roman predecessors. Extensive deposits of Upper Flamboura alluvium in the valleys below the clusters of Middle Byzantine sites (Figure 3.13) bear witness to considerable erosion of the newly cleared lands. The age of the Upper Flamboura is not well constrained; nothing later than sixth-century Roman sherds has been found in it, and Venetian cadastral maps show houses on top of it, but its location downstream from the major Middle Byzantine/Frankish settlements suggests contemporaneity with them. Debris flows make up the bulk of the deposits as they did for the Pikrodafni, pointing to similar causes: rapid clearing of steep, thin soils without sufficient erosion control by terracing.

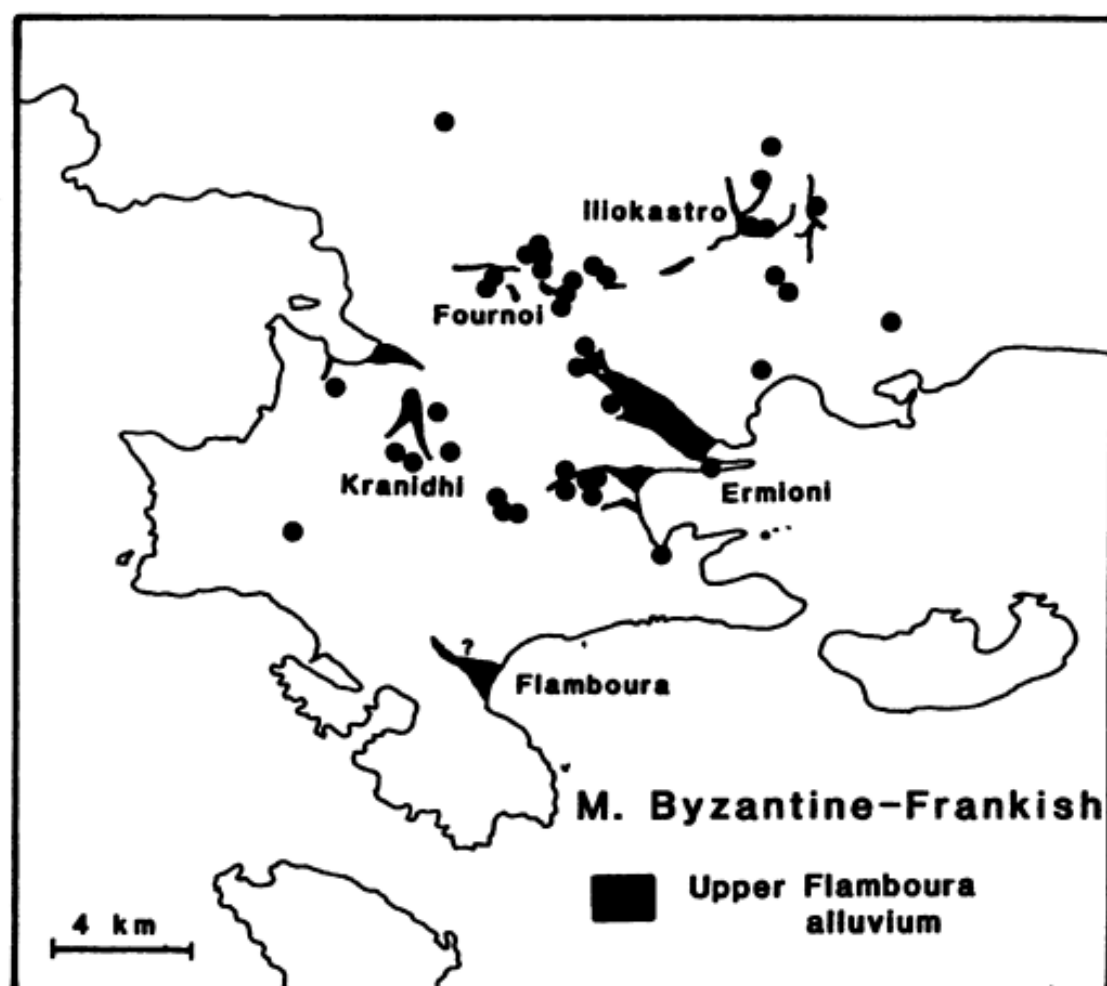


Figure 3.13. Middle Byzantine/Frankish resettlement took place largely in secluded headwaters of streams. Rapid clearing of lands unoccupied since the seventh century appears to have produced much soil erosion demonstrated by Upper Flamboura debris flows in the valleys downstream from Middle Byzantine/Frankish site concentrations.

A period of quiescence separates the Upper Flamboura with its incipient but recognizable soil from the Kranidi alluvium which has none. The Kranidi alluvium is thin and sparsely distributed throughout the area (Figure 3.14). Its age and history vary from place to place, but unfortunately its chronology is not well established, and neither are we well informed about the Frankish, Venetian, and early Modern history of the area.

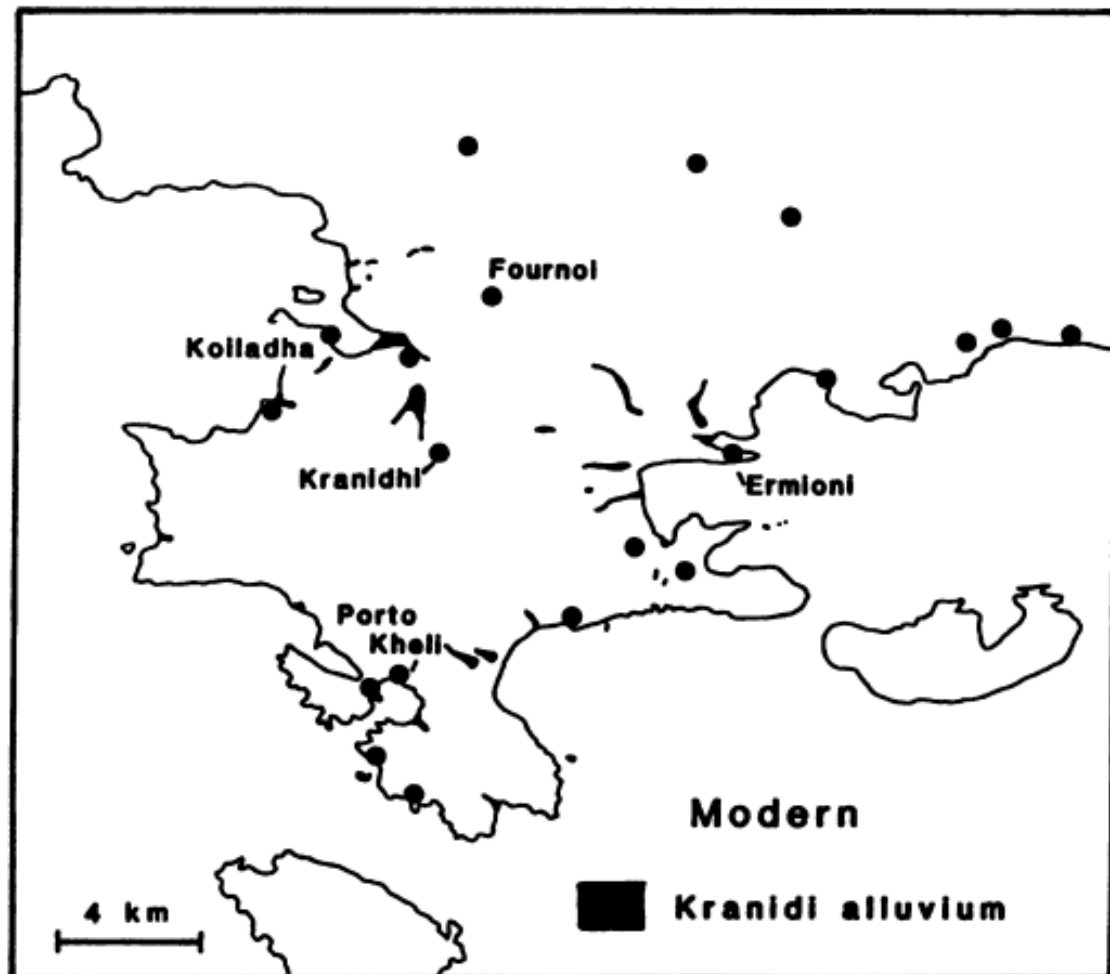


Figure 3.14. The Kranidi alluvium, though widely scattered, is small in volume. Except for the Fournoi valley deposits, stabilized for several centuries, deposition generally dates back no more than a century and continues today in many places. Black dots indicate present settlements.

The oldest Kranidi alluvium is found in the Fournoi area, but the landscape appears to have stabilized soon, probably because of prosperity brought about by the olive culture which has been successful in this valley since at least the eighteenth century (Gavrielides 1976). Other Kranidi settlements are much younger; deposition in the lower Ermoini valley began about half a century ago, but the large though thin Kranidi fans below the town of that name and in the

Flamboura area on the southeast coast may be somewhat smaller. Deposition in all three areas, as well as in many smaller ones, continues to the present time.

The Kranidi alluvium consists entirely of stream-flood sediments, implying once again, as for the Hellenistic and early Roman case, a neglect of terrace wall maintenance, now not so much because of economic adversity as because of a reorientation towards truck gardening on the better lands or towards the tourist industry. This neglect is evident in many places and directly associated with erosion and the emplacement of the alluvium.

Alternatively, some Kranidi deposition might be attributable to a climatic change which brought increases in rainfall and runoff, but once again there is no independent evidence for such an event. During the sixteenth through early nineteenth centuries, the Little Ice Age did indeed bring colder, wetter weather to northern and western Europe (e.g., Lamb 1982:201-231), but most Kranidi deposits are not that old, and whether the Little Ice Age had any impact in the eastern Mediterranean, and if so what, is wholly unknown.

Conclusions

For the past few 100,000 years, the landscape of the Southern Argolid has been mostly stable, its stream incised, its soils intact, sedimentation restricted mainly to the coastal zone. Only during three, probably rather brief intervals in the middle and later Pleistocene did a climate change alter the vegetation, increase runoff and erosion, and cause the deposition of beds of gravel and loam now conspicuous because of the bright orange red of their mature soils. The climatic changes that induced erosion and alluviation remain somewhat mysterious; during the height of the last glacial period and the subsequent climatic amelioration the landscape remained perfectly stable. Paleolithic, Mesolithic, and Neolithic settlements, few in number and widely dispersed, also had no discernible impact (Figure 3.15).

A new sequence of erosion and alluviation events began about 4,500 years ago, a thousand years after clearing of the Southern Argolid for agriculture started in earnest. Two of the four events brought debris flows and are therefore probably due to sheet erosion of slopes. We have interpreted those as the result of gradual shortening of long fallow produced by increasing settlement density or of rapid clearing of steep, marginal soils. In both cases, soil erosion control by terracing seems to have been unknown or neglected.

The other two events laid down stream-flood deposits. In the absence of independent evidence for increased precipitation and runoff and for other, circumstantial reasons, we have attributed those to neglect of a well-established system of terraces and gully check dams, with the inevitable vertical erosion, soil removal, and increased flooding of streams such neglect entails.

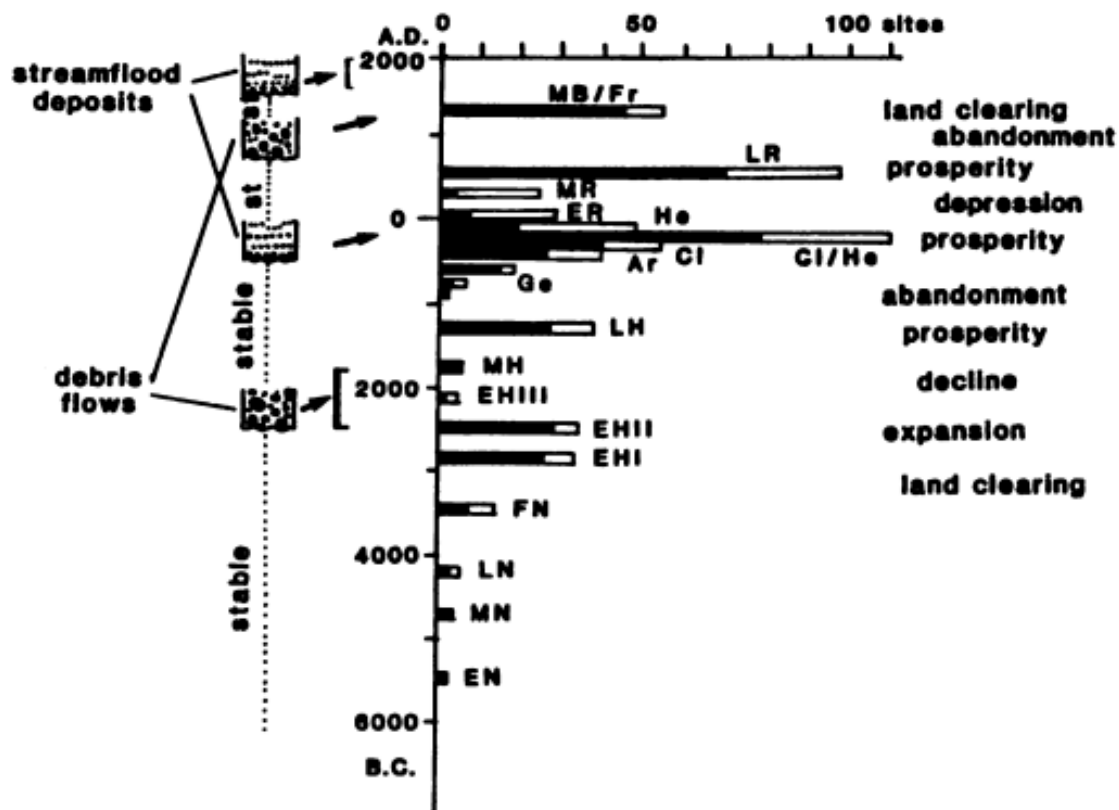


Figure 3.15. Summary of erosion and alluviation events in the context of changes with time in numbers of sites. At extreme right, inferred rural economic history is related to alternating stability and destabilization of the landscape. Black columns in histogram count confirmed sites, white the probable ones.

Two modes of land stabilization thus exist and, we believe, existed in the Southern Argolid: terracing and dam construction and, ironically, the complete abandonment of the land which allows *maquis* and pine to resettle the fields very rapidly. Two modes also exist of destabilization: careless clearing or fallow reduction in times of prosperity, and the neglect of soil conservation combined with pastoralism in times of economic depression.

Having arrived at this conclusion for the Southern Argolid, we await with considerable interest what analogous, sufficiently detailed studies elsewhere in Greece might yield to test our hypotheses. We have attributed a great deal to the shifting successes and failures of rural economies, but have we perhaps underestimated other factors, including climatic change? Even if we should be in essence correct, can one indeed commonly read as much in the sequence, timing, and nature of alluvial deposits as we have attempted to do in the Southern Argolid?

Acknowledgments

Besides M.H. Jameson who conceived the project and whose insight and encouragement were evident throughout, many colleagues participated in its execution. Without Anne Demitrack, Hamish Forbes, Timothy Gregory, Nick Kardulias, Susan Langdon, Dimitris Matsas, Mark Munn, Mary Lou Munn, Priscilla Murray, Kevin Pope, Daniel Pullen, and Susan Sutton the material for this paper would not have been prepared. We are deeply indebted to the Archaeological Service of the Greek Ministry of Culture and Sciences, especially to the successive Directors and members of the Argolide-Korinthia Ephorate in Nauplion, and to the Director and staff of the Institute of Geology and Mineral Exploration in Athens who supervised the study. The National Science Foundation, the National Endowment for the Humanities, and the National Geographic Society, and many Stanford alumni have made the project financially possible, while some 50 students assisted in the fieldwork. The project was conducted under the auspices of the American School of Classical Studies at Athens. We thank all of them most warmly.

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The Cretan Environment: Abused or Just Misunderstood?

Jennifer A. Moody

Introduction

When faced with the stark reality of modern Greek landscapes or those of the recent past as documented in turn-of-the-century photos or Venetian and Turkish period paintings and maps, many of us have wondered if the countryside plowed, pruned, pillaged and praised by the Ancient Greeks, was similar or very different. Many scholars, and especially those from more temperate climates, have found it hard to believe that such a rocky and rugged environment could have given rise to the “Heroic” and “Golden” ages of Greece. They opt for a lush reconstruction of ancient rural Greece—one akin to that depicted in the Romantic paintings of the 17th and 18th centuries. For support they cite phrases from ancient texts describing trees, woods and crystal fountains (Hughes 1983). Every mention of a tree is taken to imply a forest, and when re-quoted is magnified into a dense forest. These forests are then supposed to have been cut down during the post-Classical period leading to large scale erosion and the so-called degraded landscapes we see today.

That is to say, that the next time one of us gets parched and blistered when hiking to some remote ancient site, we can console ourselves that neither we nor Mother Nature are to blame. It is instead the fault of the ancient woodsman and farmer, now long dead and buried by the erosional debris he or she created. These people supposedly practiced poor land management because without the benefit of modern science and education, they could not possibly understand the principles of plant and soil conservation.

I may be exaggerating the situation a little, but it is rather disheartening that in this age of environmental awareness one of the most important books to be published recently on Crete still refers to the so-called deforestation of Classical Greece not only as if it were fact, but also as if it were a unique event in the landscape history of the Eastern Mediterranean (Meyers et al. 1992).

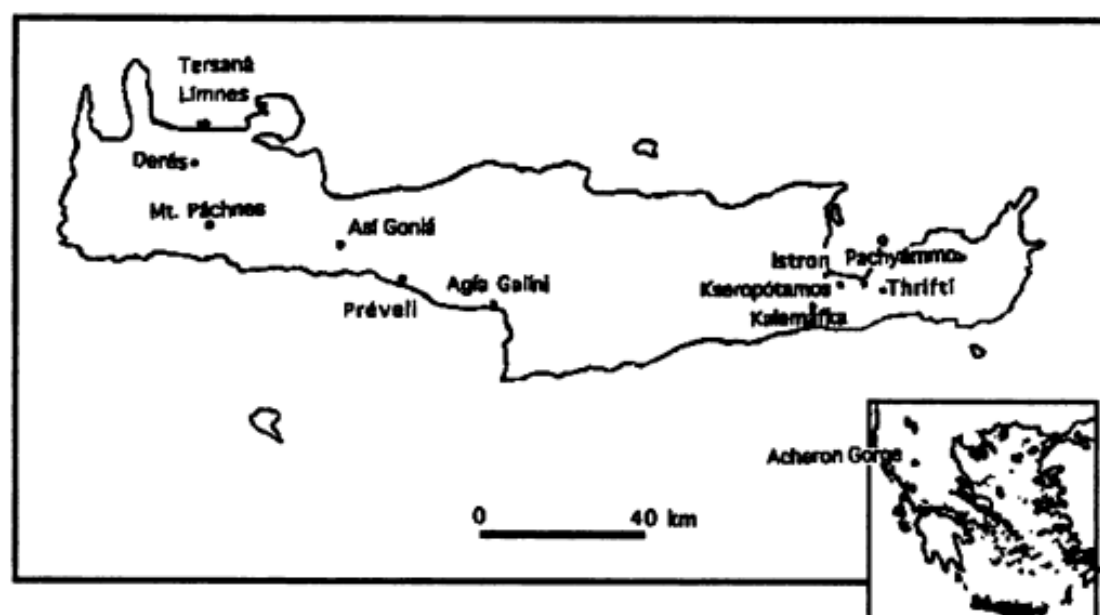


Figure 4.1. Map of Crete showing places mentioned in the text.

Since the late 1960s solid ecological research has been going on in Greece and Crete (Figure 4.1). Areas of study include erosion (Hemple 1991; van Andel et al. 1982, 1984, 1986; Vita-Finzi 1969), palynology (Bottema 1974, 1980, 1990, 1994), tectonics (McCoy 1980; Zamani and Maroukian 1981), glaciation (Fabre and Maire 1982; Hemple 1991), botany (Shay and Shay 1995), dendrochronology (Kuniholm and Striker 1987), and fauna (Sondaar 1986; Sondaar and Bockschoten 1967). The picture that is emerging bears little resemblance to the Romantic paintings of Greece or the cataclysmic histories that have been reconstructed. It is instead a dynamic, episodic, and rather complicated story. In this paper I shall confine myself to two salient topics: (1) The natural diversity and resilience of the Cretan ecosystem as we understand it today. (2) The evolution of the Cretan climate since the end of the Pleistocene.

Diversity of the Cretan Ecosystem

The Mediterranean is not a unified region. Environmental diversity within a small area is one of the hallmarks of the Mediterranean ecotype and no doubt contributed to the early development of complex cultures in the region (Halstead 1981). Crete, more than any other Mediterranean island, is a mini-continent with environments ranging from sub-tropical (Préveli, AV), to temperate (Derés, Ky), to arctic (Mt. Páchnes, Sf)—all within 30 km of each other (Figure 4.1). The

island's rugged topography also isolates weather, permitting droughts and floods to occur simultaneously.

In 1986 my colleague Oliver Rackham and I lived through what we like to call the Pachyámmos Event while working on the Vrókastro Survey Project, which I co-direct with Barbara Hayden (Hayden et al. 1992). For some days black clouds built up on the Siteía Mountains and then on September 23rd the heavens opened and it poured over 300 mm in a day and a half—almost a year's rainfall. The normally dry riverbeds soon became raging torrents which ripped away the main road bridges (Figure 4.2), and isolated Siteía and Ierápetra for days. Uprooted trees and abandoned cars were swept to the sea. Water poured through village streets and into cellars and homes.



Figure 4.2. Washed out bridge, Istron River, September 1986.

The deluge had its greatest effects at low altitudes. In gorges, like the Xeropótamos, juniper-woods which had grown up since the previous flood were torn away. In cultivated basins, tree-trunks and debris were piled high against olive-trees which were seldom uprooted. In the delta of the Istron river, flooded a meter deep, silt and gravel were deposited in some places and removed from others. Most of the chaos in the valleys seems to have involved the recycling of sediments already there.

All mountain roads were heavily damaged (Figure 4.3). Tractors were immobilized, but farmers circumspect enough to have kept their donkeys carried

on as usual. Newly plowed fields exhibited some sheet-erosion. Old-fashioned terraces with dry-stone walls were knocked about, but could be easily repaired during the winter.



Figure 4.3. Major erosional damage to a road at Aphéndi Christós, September 1986.

Areas that had recently been bulldozed showed the most damage. Gullies developed immediately in these fields. Hillsides of new, earthen, bulldozed terraces, i.e. those without stone retaining walls, collapsed and were washed away (Figure 4.4). Higher on the mountains, the degree of damage lessened. Sheets of water poured over rough land without disturbing the soil. Only much-trampled goatpaths were somewhat gullied.

About nine days before the Pachyámmos Event, a marl slope of about 30 degrees was burned. The cause of the fire is unknown, but intentional or not, it clearly got out of hand. The deluge washed away the burnt debris and caused some very slight gullying. Rackham and I have revisited this burned area several times since 1986 and have not observed any significant signs of erosion.

Like flash floods in Texas, these dramatic events were surprisingly localized. We traced the effects of the storm over an area of only 24 km², stretching from Thriftí in the east to Kalamáfka in the west (Figure 4.1). Such isolated events within Crete make it perfectly possible for the terrain of Apokóróna to be heavily eroded, while that of Kissámou is not; differences in bedrock complicate the picture further.



Figure 4.4. Eroded bulldozed terraces, Xeropotamos drainage, September 1986.

What is curious is that when erosional events with debris records similar to those of the Pachyámmos Event are observed in sediment scarps, they are frequently interpreted as environmental degradation due to human mismanagement of the landscape (McNeill 1992; van Andel et al. 1986 and this volume). The possibility that some could be the natural consequence of climatic and/or tectonic phenomena is dismissed or deemed too difficult to determine (van Andel and Shackelton 1982).

In the case presented here, the havoc caused at low elevations seems to have had little to do with human intervention in the landscape. The uprooting of trees, side-cutting of valleys, and subsequent slumping of riverbanks happened in both cultivated and uncultivated areas. It is true that at middle elevations most of the damage was associated with bulldozing (i.e. human activity), but it seems that very little of the eroded sediment made it into the valleys to form scarps for future ecologists to study. Most of the “new” sediments observed in places like the Istron delta came from riverbank slumps caused by side-cutting. Such material contained a mix of modern surface debris (i.e., plastic toy trucks, irrigation hose) and buried ancient artifacts. For millennia Cretans have been battling against the natural processes of side-cutting and slumping by building retaining walls along riverbanks and even small gullies. Today many of these walls are in disrepair, allowing side-cutting to occur. This is not human

mismanagement of the landscape; it is a return to nature. Erosion and other natural forces are relentless in their assault on the various elements of the landscape. Without the retaining walls the sediment would have been washed away by some long past and forgotten flood.

The tendency for modern ecologists to blame humanity for most—if not all—the environmental problems we are facing today, seems to be reverberating in current paleoecological interpretation. Such bandwagon ecology can only be curtailed if each event in every valley is individually studied in terms of climate, tectonics, and bedrock before the impact of human activity is considered. Although it will not always be possible to separate these phenomena, we should at least make the attempt.

Resilience of the Cretan Ecosystem

Exclosure studies by Greek ecologists of modern Cretan vegetation show that species diversity can triple in two years (Koutsidou and Margaris 1990). Observations of the Cretan environment over the last 18 years show that while more intensive land-use may reduce tall *maquis* to low *maquis* or shrubs, no amount of cutting, burning or grazing will turn *maquis* into something else (Moody 1987; Rackham 1981; see Forbes this volume). The only way to get rid of *maquis* is to grub it out by the roots or to poison it. Unless this is done, when land-use declines shrubs will grow into trees—provided there is enough moisture.

Rackham and I have compared numerous nineteenth and early twentieth century paintings and photos of the Cretan landscape with modern locales (Fowler 1984; Trevor-Battye 1913). We have found almost every scene much more wooded than before. A comparison of photos over a 20-year period shows that much of the Cretan vegetation can recover in only a few decades of reduced pressure (Rackham 1991). Even the river bottom vegetation that was ripped out during the Pachyámmos Event is making a remarkable recovery.

Reduced land pressure is most likely to occur through declining population, although changing economic, technological, and social traditions can also play a part. The complex relationships among these factors have been explored in depth by many scholars and are included in any study on carrying-capacity (see Green 1980 for a bibliography). Fewer people, whether eliminated by epidemic disease, rampant warfare, or migration, usually translate to the landscape as fewer cleared and cultivated fields, less cut timber, less cut fuel and fodder, and less livestock browsing the vegetation. In short, “bad times for men are good times for trees” and are usually marked by increases in woodland. In the southern Argolid, van Andel et al. (1986, and this volume) determined that complete abandonment of agricultural terraces did not lead to their deterioration and loss of the sediments retained behind them because *maquis* vegetation quickly reestablished itself and anchored the soil.

The Así Goniá Pollen Core and Venetian Crete

Surviving archives and histories indicate that the Venetian and Turkish periods on Crete were punctuated with devastating plagues, famines, and revolts (Grove et al. 1991). Given our hypothesis, such times should show some increase in woodland. The Así Goniá pollen core, from the mountains southeast of Réthymnon is the only palynological record for this period on Crete and does indeed reveal increases and declines of vegetation of the kind we might expect (Hall et al. 1990).

The bottom of the core probably dates to the sixth century AD and the top to the nineteenth century. The Early Byzantine mountain landscape was one of evergreen and deciduous oaks, with occasional maples, alders, and hornbeams. Plane is significant throughout, and still grows around the bog today. Olive pollen is also present in small quantities and either indicates cultivation at a distance or occasional wild olive in the natural woodland.

The vegetation changes dramatically at the end of the Late Byzantine period or the beginning of the Venetian. Tree pollen (chiefly prickly-oak) drops from 80% to 30%, but without a definite increase in charcoal. This could mean felling for timber.

The fall in tree pollen leads to a predominance of heather, rushes, grasses, and bracken throughout Venetian times. The remaining woods or *maquis* were of prickly-oak and arbutus, with some deciduous oak, olive, and a little hornbeam. Charcoal fragments increase steadily until the Late Venetian. All this indicates great pressure on the land and—since most of the plants respond well to fire—increased burning. In Early Venetian times oak pollen briefly increases from a low of 5% to about 30%, perhaps in response to the five or more rebellions that wracked the island in that century. Another, but lesser, rise in tree pollen occurs between the sixteenth and seventeenth centuries when Crete was beset with at least six plagues, four famines, one revolt, the Ottoman conquest, and the severe weather of the Little Ice Age. A more wooded phase occurs again in the Late Turkish period and could be related to the rebellions that shook the island from 1770 to 1898. Olive pollen also increases in the second half of the Turkish period. This is not surprising since most extant olive trees in Crete are between 200–300 years old (excluding those planted since WW II). Charcoal is abundant throughout the Ottoman period.

Although there is no means of telling how typical the Así Goniá core is for these periods, it does help negate the simplistic argument that if Classical Crete looked like Modern Crete, then Medieval Crete probably looked like Modern Crete, too. Earlier episodes of greater and lesser pressure on the Cretan landscape have occurred, and also probably resulted in less and more wooded landscapes (see below and Rackham and Moody 1996).

Little Ice Age Weather

In addition to the vagaries of human activity, land pressure is complicated by lesser fluctuations in the Mediterranean climate, such as the Little Ice Age (Grove 1988, 1990). Studies of Mediterranean weather between 1550 and 1850 by Jean Grove and Annalisa Conterio (1994, 1995) indicate that expansions of mountain glaciers in Europe correspond to periods of unpredictable weather, droughts, harsh winters, and terrible rains around the Mediterranean:

In some years, and groups of years, weather conditions occurred which were apparently anomalous by twentieth century standards, especially winter and spring droughts, exceptionally severe winters, and summer rain. ... Some winter droughts were longer lasting and more extreme than any since instrumental measurements began [1910]. These could affect wide regions and are taken to have been caused by the extension of southerly air masses from the Sahara. The incidence of severe winters leads to consideration of evidence for snowfall having been heavier and longer lasting than in the nineteenth and twentieth centuries. Deluges seem to have been similar in intensity to twentieth century storm events, but some may have been more extreme and extended more widely. Records of summer rains were found to be rare compared with those of winter drought and severe winters. (Grove and Conterio 1995: 223)

Similar phases of glacial expansion may have occurred from Late Neolithic (LN) through Early Minoan (EM) I (4400-2800 BC); Middle Minoan (MM) II to Late Minoan (LM) III (1850-1350 BC); Protogeometric to Orientalizing/Archaic (1000-650 BC); and minor advances during the Early Byzantine period (AD 400-650) and again in the Venetian and Turkish era (AD 1270-1800) (Goudie 1983; Grove 1979; Lamb 1977; dates calibrated according to Klein et al. 1982). Given the inadequacies of paleoenvironmental data for Crete, it is tempting to use the Mediterranean Little Ice Age climate reconstructed by Grove as an initial model for these earlier periods—provided it is not contradicted by other existing proxy climate data such as pollen, sediments, ice cores, etc.

There is also a strong correlation between periods with possible Little Ice Age-type climates and activity in the high mountains of Crete (Watrous 1982; Nixon et al. 1990). There are many reasons why this might be so. One possibility is that winter drought in the lowlands drove herders higher and higher into the mountains in search of greener pastures. There is even a possible correlation between an increased dependence on pastoralism and these Little Ice Age episodes (see below).

Landscape History of Crete

At the close of the Pleistocene, Crete was a heavily browsed, dry island populated by unusual dwarf herbivores and giant insectivores (Sondaar 1986; Sondaar and

Boekschoten 1967). Environmental zones would have been shifted downwards by severe glacial conditions high in the mountains; but they also must have been compressed, since very low-altitude endemics such as the Cretan palm survive along the coast (Farrand 1971).

The Agía Galíni pollen core, from the southwest central coast, suggests that just before the Neolithic settlement of Crete the wetter parts of the island had near-continuous woodland while the drier parts were a mosaic of *maquis* and steppe (Bottema 1980). The woods were a mix of Mediterranean and Central European trees: deciduous and evergreen oaks, linden, elm, hazel, alder and hornbeam. The overlapping temperature and rainfall tolerances for this diverse group of plants is fairly narrow. A less evaporative climate—probably somewhat wetter, less strongly seasonal, and with winters not much colder than today—would meet the requirements.

What role the indigenous mammals played in this landscape is unclear because, in spite of recent studies, we do not know when they disappeared (Lax and Strasser 1992). Nevertheless, by the time the Neolithic settlers arrived around 6000 BC, the animals were only a minor element in the landscape, if present at all (Jarman n.d.). The native herbivores were eventually replaced by domestic animals brought by the settlers, but these animals did not come at first in large numbers, nor were they specifically adapted to the Cretan environment (Broodbank and Strasser 1991). During the browsing lull between a countryside populated with dwarf deer and hippos and one populated with domesticated sheep and goats, Crete was probably more extensively wooded than at any time in its history. Although we do not know the exact chronology of this wooded interval, the pollen records from Agía Galíni, Tersaná, and Límnes suggest that woodland was on the increase until the Middle Neolithic (Gennett 1982; Moody 1987; Moody et al. 1990; Moody et al. 1996).

This woodland was made up of the same mix of Mediterranean and Central European trees as the pre-Neolithic forest, but with an interesting addition in the Middle Neolithic: olive. This event is well-dated by a radiocarbon sample in the Tersaná core (5800 ± 130 BP). The nearest place one can see this combination of plants growing today is in the Acheron Gorge of Epirus, 500 km to the north.

By the LN olive pollen is abundant enough (15%) in the Tersaná core to indicate local cultivation. This is a significantly different picture from that on the Greek mainland, where olive does not become an important crop until the Late Bronze Age or later (Hansen 1988; Runnels and Hansen 1986). The seemingly early development of olive cultivation in Crete may have played a part in the island's precocious cultural development in the Aegean World (Moody et al. 1996).

A possible decline in agricultural activity during Final Neolithic (FN) and Early Minoan I shows up in the Tersaná core as a decrease in olive pollen and an increase in oak and pine pollen. Evidence for burning also increases. Charcoal is present in the sediments and fire-dependent plants (pine, heathers, cistus,

asphodel) increase. The increase in pine suggests that hitherto open fields were no longer cleared for cultivation. The burning may have been intended to maintain pasture for livestock. Simultaneous declines in linden, hornbeam, hazel, elm, and poplar pollen—all popular fodder sources—could be the result of “cropping” these tasty trees for fodder.

Trees like prickly-oak which are well adapted to browsing can survive and provide leaf fodder indefinitely at a height of less than 10 cm. They rarely bloom, however, until they reach a height of 1 m or more, at which point they may flower profusely. Other fodder trees like linden, elm, and hornbeam will not bloom until they reach a height of 2.5–3 m. If a tree or shrub does not bloom, it does not produce pollen and therefore does not show up in the pollen record. Therefore, when trees are kept in a shrubby state of less than 1 m by continual browsing (or some other mechanism), as is the case for much Mediterranean *maquis* today, pollen production is significantly reduced.

Cutting the foliage of trees for fodder by shredding and especially by pollarding at frequent intervals has the same effect on pollen production as browsing, except that the affected vegetation can be much taller because humans are capable of climbing mature trees and lopping off branches beyond the reach of browsing livestock. Anderson (1988) notes that pollarding, more than shredding, significantly reduces flowering. Both techniques, as well as coppicing, are known to have been practiced in Crete from Medieval times on (Rackham and Moody in press). Wood cropping cycles can be recognized in tree-ring records. It is, however, impossible to distinguish shredding from pollarding from coppicing by wood structure alone. Early Minoan tree pruning has been suggested by the wood structure of olive charcoal from Myrtos Fournó Korifi, but we cannot say which pruning technique was used (Rackham 1972).

The FN and EM I periods were contemporary with a phase of European glacial advance, a coincidence which could indicate unpredictable weather, droughts, hard winters, and terrible rains around the Mediterranean (see above). They were also when the high mountains were first exploited (Moody et al. 1996). Traditionally, the high mountains have been the domain of shepherds and goatherds. They have also served as strongholds for rebels. More recently the mountains have been invaded by ecotourists. It seems most likely that the FN/EM activity in the high mountains or *madhares* was for traditional pastoral purposes, but this cannot yet be proven. Nor is it known if the pastoral interval proposed here for FN/EM western Crete is representative of the island as a whole. It may be peculiar to the region.

Pollen data suggests that olive cultivation peaked in the Early Bronze Age, implying substantial land clearance. Surviving woodland was still dominated by deciduous oaks and hornbeam.

Despite a general increase in wetland and Central European tree pollen at the end of the Early Bronze Age, linden and hazel disappear from the Tersana diagram and probably from Crete, never to return except as garden trees or

cultivars. Linden pollen also disappears from contemporary levels of all other pollen cores known to me from southern Greece (Moody 1987).

During the Middle Bronze Age, agricultural activity declined on the Akrotiri, allowing natural woodland to increase. Interestingly, the vegetation reverted to a *steppe*-woodland mosaic rather than the *garigue*-woodland mosaic of the Early Neolithic. Although changes in landuse may have been responsible for the fluctuations in olive pollen and perhaps for the disappearance of linden, they cannot account for the mosaic shift from *garigue*-woodland to *steppe*-woodland. The most likely explanation is that the climate became drier, perhaps by concentrating rainfall in fewer months. Such a change may mark the development of the Mediterranean dry season for this interglacial.

It is difficult to know what the situation was for the Late Bronze Age on Crete because no existing pollen cores cover the period. Pollen cores from the Greek mainland, which like Cretan cores are from low elevations, show a general increase in trees towards the end of the period—including the occasional reappearance of linden (Bottema 1994). This suggests a less evaporative climate, but it is difficult to know by what mechanism. Did temperatures drop, rainfall increase, or did the annual distribution of rainfall change? Since the Late Bronze Age was again a time of glacial advance in Europe, it is tempting to attribute the “less evaporative climate” to colder temperatures and unpredictable weather, as suggested by the Little Ice Age model. The end of the Late Bronze Age was also a time of great social upheaval, especially around the eastern Mediterranean, commonly associated with incursions by the Sea Peoples. It is possible that the increase in woodland suggested by the pollen cores was the combined result of climate and social instability.

There are no pollen cores from Crete that cover the Early Iron Age to Hellenistic periods either, forcing us again to extrapolate from mainland Greece, but even there the data are poor. What data exist suggest a vegetation little different from today’s (Moody 1987; Sheehan 1979). Nevertheless, Theophrastus (II. 47), writing in the fourth century BC claimed that the winters were more severe than previously, resulting in the abandonment of agriculture in the mountain plains of Crete. It is worth noting that “previously” may refer to the Archaic period which was contemporary with a period of glacial advance in Europe.

Conclusions

There can be little doubt that important environmental transformations took place during the Neolithic and again in the Bronze Age on Crete. These changes were partly due to human activities: extermination of the native mammals; destruction of some natural vegetation for cultivation; modification of the remaining natural vegetation by woodcutting and occupational burning; and the browsing of a

different set of wild and domesticated mammals. However, many of the changes were due to shifts in climate independent of human affairs. For example the development of a Mediterranean-type, summer dry season for this interglacial seems to have matured in the Middle to Late Bronze Age and resulted in the reduction and even the disappearance of a number of temperate ecotypes which had flourished in the Neolithic.

This, however, does not mean that the climate of Crete has remained the same since the Late Bronze Age. At irregular intervals, Little-Ice-Age-type episodes have punctuated Cretan history causing short term but significant changes in the landscape. The severe winter and spring droughts characteristic of these episodes may have driven herders high into the mountains in the FN and Early Bronze Age. Flash floods and drought in the lowlands may have destroyed crops and encouraged a greater dependence on livestock. Some Little Ice Age periods, such as the Late Venetian and Early Turkish, coincided with reduced land pressure and show an increase in woodland.

The quick response of Cretan vegetation to even brief reductions in land pressure such as the exclosure experiments of Kotsidou and Margaris (1990) indicates that it is extremely well-adapted to episodic stress, whether naturally or humanly induced. It makes no difference to a tree if it has been uprooted by a flash flood or a bulldozer. It makes no difference to a herb if it has been eaten by an indigenous dwarf deer or an introduced domesticated goat.

So far, human attempts to alter these natural processes, such as the construction of retaining walls to prevent soil erosion, have not been successful in the long term. The same is true for human-related impacts on the vegetation—browsing livestock, woodcutting, and burning. As soon as the stress disappears, the vegetation rebounds.

Such adaptations do not happen overnight: they take thousands of years to develop. Flash floods, both more and less severe than the Pachyámmos Event, have poured over the Cretan landscape for eons ripping out trees and scouring out riverbeds and gullies. Herds of hungry animals have deflowered and devoured Cretan plants for 200,000 years or more. In spite and because of all this, the Cretan landscape is what it is today: diverse and extremely robust.

So the next time you go tearing off to a remote site in Crete with no hat and too little water, remember that the stark and beautiful landscape is by and large the product of natural cycles of environmental change. So, if you die of the heat, you have nobody to blame but yourself and the powers that be.

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Landscape Archaeology of Medieval and Pre-Modern Greece: The Case of Nemea

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Introduction

Systematic archaeological survey is an important method for the study of regional, cultural and environmental history. Surveys are an economical non-destructive means of collecting primary data from a large area. They provide data relating to the economic, social and political organization and the impact of human land use practices on the landscape.

Regional surveys are a relatively recent form of archaeological research in the Mediterranean and especially in its eastern part, in countries like Greece. Over the last two decades they have become instrumental in providing a new perspective and a strong empirical base on which interpretation of the prehistoric as well as the historic rural settlement patterns can be based. In this paper I will limit myself to the historic periods, and primarily to the medieval.

The historical importance of the countryside and of rural transformations was not recognized in the past and was not an important aspect of archaeological research in the Mediterranean. But, because the essential means of production for the pre-industrial era lay in the countryside, one has to study and understand its complicated evolution in order to understand the changing world of the Mediterranean (Dyson 1988:145). As a result, in the last twenty years many studies of the Roman and the Medieval countryside in various parts of the Mediterranean have been undertaken. Archaeological surveys provide data on rural settlement, land use, agrarian systems, subjects that the available written sources do not cover or cover very poorly. Diachronic coverage is one of the great strengths of such surveys. The diachronic perspective of these surveys has led to a serious treatment of the medieval and post-medieval material, which was frequently dismissed in the past. In addition, most recent intensive surveys focus on the landscape as a whole, rather than being concerned only with sites.

The Italian Picture

A recent synthetic work, *Roman Landscapes*, is dedicated to survey in Italy and the Northern Mediterranean provinces of the Roman empire (Barker and Lloyd 1991). It is a very good example of the accomplishments of survey archaeology in the Mediterranean and of its future potential. Ultimately, regional survey data can be used to address mainstream issues of Roman social and economic history, such as the rise of the large estate, the fate of the peasant farmer, the cycles of expansion and contraction of agriculture, demographic trends, the transition from Roman to Medieval life, and so on.

Survey in Italy has also made significant progress in documenting Early Medieval settlement, like the San Vincenzo survey in Molise, which introduced significant methodological improvements in order to locate sites of the 8th-10th centuries. From the historical sources it was predicted that there would be continuity of dispersed settlement from the Late Roman period into the Dark Ages. The survey did not support this prediction, instead it documented a process of centralization and contraction of settlement that started in the Late Roman period and developed in the succeeding period into a more nucleated pattern or loosely aggregated settlements built on low hills (Hayes 1985). Another successful survey concentrated around the Early Medieval abbey of Farfa in the Dabine Hills near Rome. The abbey has one of the finest territorial archives in Europe; the integration of the field-walking with the study of this archive has located one of the largest groups of Early medieval rural settlement in Italy (Barker 1991:4).

Byzantine Archaeology

As a contrast, I would like to discuss the state of the field in the eastern Mediterranean. Byzantium, as the Eastern Roman empire is known, is one of the least known societies from an archaeological viewpoint. As defined conventionally, the Byzantine Empire starts with the foundation of the city of Constantinople in AD 324 and ends when the city was captured by the Ottoman Turks in AD 1453. Constantinople, the primate city, and its monuments dominate the literature. In general Byzantine studies revolve around art, literature, religious architectural history and iconography. Little is known about everyday life from an archaeological viewpoint. The archaeological study of Byzantium lags considerably behind that of medieval Western Europe; in the last few decades the study of the latter period has developed into a major branch of historical archaeology.

Part of the reason for such a state of affairs is the fact that written sources dealing with aspects of everyday life are rare. Records of the central government,

provincial administration, landowners, merchants etc. have not survived. In other words records useful for deducing demographic and economic trends with some precision have all disappeared. There are a few exceptions of well-preserved and studied monastic archives in several places, especially in Northern Greece (Laiou 1977; Mango 1980:6-7).

However, the more general explanation for this situation has to do with the historical development of the field. In general, Byzantine studies, including archaeology, have developed as post-classical by-products of Greek and Roman studies. Byzantine archaeology, especially, remains characterized by very traditional attitudes. The interest, clearly, has been toward the elite, with a special focus on monumental architecture and luxury goods (Rautman 1990). In addition, the search for classical antiquity has resulted in the loss of a significant part of the medieval layers in excavations of sites with well known classical remains, carried out in the late 19th and the earlier part of the twentieth century. The "uninteresting" post-classical layers were routinely removed, in the majority of cases without even being recorded, a common practice which only changed in the late 1970s and 1980s (Rosser 1979: 155).

Finally, questions of cultural continuity and the role archaeology had to play in the process of Greek nation building from the nineteenth century on, are issues of importance in this context. The European vision of Classical Greece undoubtedly has influenced the development of Greek archaeology. The young nation looked back to the classical past as the basis for the formation of a national identity (Herzfeld 1982; Kardulias 1994b:49). As a result, this segment of the past was glorified and the Hellenic tradition reclaimed. Such factors have contributed significantly to the neglect and even destruction of the medieval archaeological record.

The Importance of Regional Surveys

Regional surveys, because of their diachronic focus, mark the first significant break with this tradition of very selective study of the past, in countries like Greece. In Greece the first important regional project was the University of Minnesota Messenia expedition, which investigated the SW corner of the Peloponnesos between 1955-1969 (McDonald and Rapp 1972). Although its main focus was the prehistoric Bronze Age, it expressed interest in long term change and produced a diachronic regional synthesis. The archaeology of later periods, however, was underrepresented, due to the poor state of knowledge of the medieval material (Gregory 1986:160).

Since then, many more surveys have been organized in Greece, mostly by prehistorians inadequately prepared to deal with the "post Roman" material. At the same time a number of extensive surveys focusing on the medieval period have been undertaken (Dunn 1982; Gregory 1986; Ince et al. 1987; Lawrence

1983; Lock 1986). But it is a number of recent intensive surveys, sharing similar methodology and overall scope, that have produced a significant record of rural medieval settlement (Bintliff and Snodgrass 1985; Cherry et al. 1991; Jameson et al. 1994; Kardulias 1994a; van Andel and Runnels 1987; Wells et al. 1990). Within a few years, our knowledge of medieval rural settlement in Greece will greatly improve, enabling us to use survey data to trace and explain inter-regional variability. In other words, survey archaeology offers the only means of writing the rural history of medieval Greece.

The Nemea Valley Archaeological Project

My data base for the period under consideration comes from the Nemea area in the NE Peloponnesos of Greece. The project, known as the Nemea Valley Archaeological project (NVAP), was undertaken between 1984-1991. Here, I will present a brief analysis of the pattern of medieval settlement in the Nemea area and also attempt to compare the archaeological evidence with historical sources. But first, I would like to discuss the general goals of NVAP and some factors that may affect interpretation of survey data.

The primary goal of NVAP has been to document and explain changes in patterns of settlement and land use at all times in the past (Wright et al. 1990:583). This perspective requires that political and economic relationships between the area and more extensive regional systems be considered in light of available archaeological, but also historical and ethnohistorical data. A lengthy preliminary report appeared in 1990 (Wright et al. 1990). It presents a comprehensive view of over-all trends in settlement and land use in the Nemea area.

Specific problems addressed by the archaeological survey, in addition to the general goals, fall into three distinct categories: (1) to establish the distribution of artifacts of particular dates within the survey area; (2) to evaluate how far such distributions represent past patterns of settlement and other human activities; (3) to provide some explanation for long-term changes in the human behavior reflected in such patterns. These issues require careful consideration of geomorphological processes which in some cases may have been responsible for the dispersion and redeposition of artifacts (Wright et al. 1990:603).

The Role of Geomorphology

Survey archaeology is as complicated as excavation archaeology. More than anything else, geomorphological change (erosion, alluviation, colluviation) is responsible for a complex range of factors which affect the interpretation of

survey data. For example, erosion may distribute artifacts over the ground surface or obscure parts of the fossil cultural landscape under blankets of soil.

In 1969 Vita-Finzi used a large body of evidence from across the entire Mediterranean and defined two major phases of alluviation, the Older and the Younger Fill, each silting up stream channels, valley floors and coastal plains. The Older Fill tends towards red tones, the Younger one to brown and grays, thus they can be easily recognized. The Older Fill was formed in the late Pleistocene (ca. 50,000-10,000 BP), while archaeological data suggested to him that the Younger Fill had been deposited between Late Roman (ca. AD 400) and Early Modern times. Both events were attributed to climatic factors. Vita-Finzi's model has been applied to Greek archaeology by Bintliff (1976a, 1976b, 1977). Wagstaff (1981) after a comprehensive analysis of the evidence for the complex history and local variability of late Holocene alluviation, concluded that anthropogenic rather than climatic factors might have been responsible for the Younger Fill. More recently, detailed archaeological and geomorphological studies in Italy and Greece (see van Andel et al. this volume) have found phases of sedimentation occurring at different times in different places in the last few thousand years, with human settlement and land use commonly regarded as the principal culprits.

Van Andel et al. (1990) initiated a series of studies of prehistoric and historical soil erosion in Greece. The first, a part of the Argolid Exploration Project of Stanford University, yielded a model that related soil erosion and alluviation primarily to human land use (Pope and van Andel 1984). In the Argolid, van Andel and Runnels (1987) defined four phases of environmental degradation in the last 5000 years, two characterized by debris flows (Bronze Age, Byzantine) and two by gully erosion (Hellenistic, Modern). Moreover, they propose a different explanation for each of these episodes: agricultural intensification in the Bronze Age (shorter fallowing resulting in greater areas of plowzone vulnerable to erosion), terrace abandonment and damage by herding in the Hellenistic period, woodland clearance in the Byzantine period in the context of demographic and economic expansion, and in the present day forest destruction, land drainage, mechanized deep plowing, and monoculture (Barker 1991:7).

The data for the historic period should be examined in more detail. Van Andel et al. (1990:383) have found evidence of extensive, well-sorted and stratified streamflood deposits laid down in the valleys during the last few centuries BC, simultaneously with a sharp decrease in the number of sites (Runnels and van Andel 1987). Widespread settlement on all usable lands reappeared in Late Roman times (third-seventh centuries AD) apparently with good soil conservation practices, because erosion and alluviation did not occur. The landscape continued to remain stable, presumably because of rapid recolonization by the Mediterranean shrub vegetation called *maquis*, during the next period of depopulation which began in the seventh century AD. Then,

possibly as early as the ninth century AD, upland and headwater areas away from the sea were resettled, while extensive deposition of debris flows took place in the valleys below the new settlements, but stability returned eventually. The final alluviation episode began in Early Modern times. It is localized in extent, happened at different times in different parts of the region, and continues today in several places. Its relation to local economic conditions is clear. Land speculation related to a booming tourist industry is more rewarding than olive groves, and the valued crops such as citrus and vegetables can only be grown on the best soils. Hence terraces are allowed to decay and land is carelessly cleared with bulldozers (Pope and van Andel 1984; Sutton 1987).

Alluvial deposits of medieval to modern times are common. Budel (1965) and Dufaure (1976) have described major alluviation at Olympia between the seventh and fourteenth centuries AD. Genre (1988) has discussed major stream aggradation in the ninth-twelfth centuries AD in central and northern Euboea, comparable to and roughly synchronous with one of the events in the southern Argolid. Many other cases, ranging from the ninth century (Middle Byzantine) through the Turkish period, have been compiled by Wagstaff (1981) in his analysis of Vita-Finzi's "Younger Fill". From this he concluded, as van Andel et al. do, that, over the last 1500 years, stream aggradation was episodic and localized in the Eastern Mediterranean, with intensities and dates that varied from place to place. This implicates human interference with slope equilibrium as the principal cause, rather than climatic changes such as the Little Ice Age (fifteenth through mid-nineteenth century AD). This view contrasts with that of Vita-Finzi (1969) and Bintliff (1976a, 1977), who attributed both the Older and the Younger Fill to climatic changes (van Andel et al. 1990:390).

The evidence that can be brought to bear on the problem of natural versus humanly-induced landscape destabilization in the Aegean, although still limited, appears to point to the dominant role of human activity. Van Andel et al. (1990) see a strong case for attributing the frequent but quantitatively minor alluviations of the middle and late Holocene to human activity. As they point out, once the Greek landscape had been controlled by soil conservation measures, its equilibrium became precarious, the price of maintaining the equilibrium was high, and economic perturbations were only too likely to disturb it. The chronology is not very precise and this is also true for the understanding of how the processes of soil erosion and alluviation relate to land use practices and rural economics (van Andel et al. 1990:392).

Additional data bearing on these issues have been obtained from the Argive plain (Finke 1988) and the Larissa basin in Thessaly (Demitrack 1986) to test and refine this model. At the same time, other archaeological surveys in Greece (e.g., Aetolia—Bommelle 1987; Boeotia—Bintliff and Snodgrass 1985; Melos—Davidson and Tasker 1982; Nemea—Cherry et al. 1988) and elsewhere in the Mediterranean (e.g., Barker et al. 1986; Brückner 1983, 1986; Delano

Smith 1979; Gillman and Thornes 1985) have begun to include geological studies as well.

The Nemea Valley

Nemea lies in an area that receives approximately 600 mm annual rainfall. The modern wild vegetation consists of *maquis*, garigue and steppe vegetation associated with hard limestone, while lush *maquis* grows on soft limestone and marl. Woodland in the upland regions is on the increase, partly a result of the decline of shepherding in recent decades. The present landscape is very much shaped by human activities, primarily cultivation. Well over half of the Nemea region is now under cultivation. Increased cultivation has been a significant trend in this region since Greek Independence (Wright et al. 1990:591, 602).

Geomorphological investigations in the Nemea valley have focused on the formation of Holocene land forms and on the effects of human exploitation on cycles of erosion, deposition and soil formation. The landscape of Nemea has been periodically unstable and the environment has changed considerably since humans first settled there. The results indicate that at least three times since the Early Neolithic period the hill slopes around the main valley became unstable and shed alluvium into a drainage network which was unable to transport all of it. The result was aggradation on the valley floor. Stream deposition and colluviation have been important for filling in the valley. At least three phases of stream deposits, separated by long intervals of no deposition and soil formation, occurred in the Early, Late and Latest Holocene (H1,H2,H3). The H1 contains Early Neolithic pottery and it is clear that it began to be deposited at some stage after that period. For the H2 phase the archaeological evidence suggests two different times, because at the Sanctuary of Zeus an early phase buried the Classical Greek remains and a later one covered walls of the Byzantine period. This is the erosional episode of most interest to the present study. It could possibly relate to woodland clearance or terrace abandonment, but dating of this episode is not very precise at the moment. Deposition in the Latest Holocene (H3) is not voluminous, although the modern practice of bulldozing terraces out of the soft marl slopes and cultivating them without building terrace walls has already caused thin but widespread colluviation downslope. Sluggish drainage created seasonal or perhaps year round swampy conditions sometime in the Early or Middle Holocene, as indicated by auger cores, while there has been a long-term evolution towards the better-drained conditions seen today. The role of humans in these changes, in both historic and prehistoric times, remains to be determined (Wright et al. 1990:587-591). In general, the importance of geomorphological processes has to be emphasized because they may affect the number of sites and off-site scatters recorded by surveys. In addition, these processes may be related to land use practices of the past and shifts in settlement.

Settlement Pattern Interpretation

Another issue of importance is the fluctuation in the number of sites from different chronological periods and regions. Intensive systematic surveys in the Nemea Valley, Boeotia, the Southern Argolid, Keos, and the Berbati-Limnes area share similar methodologies and overall goals and have produced results that can be used comparatively. Such surveys have identified periods when the density and numbers of settlements changed considerably. These shifts may have been connected to periods of economic expansion and contraction and to population fluctuations, reflecting periods in the past when there were system collapses with serious consequences for populations at the local level (Runnels and van Andel 1987). However, periods of growth and expansion are identified in some regions but not in others, showing that settlement growth and decline are uneven processes.

In general, the settlement pattern seems to have alternated from a nucleated to a dispersed one. The dispersed pattern is associated with periods of increased population and human activity. For example, in the Southern Argolid, the number and density of settlements seems to have increased whenever access to external commercial markets was available. When such access was cut off or markets disappeared, settlement density fell and presumably population along with it (Runnels and van Andel 1987). Economic processes have also been associated with environmental changes, as discussed earlier. Localized soil erosion and alluviation episodes have been attributed to changes in settlement and land use practices. In the Southern Argolid debris flows have been attributed to woodland clearance in the Byzantine period in the context of demographic and economic expansion. An erosional episode has also been identified in the Nemea valley and dates broadly to the Byzantine period. However, I would hesitate to attribute this event to the intensive land use practices, which seem to have characterized the medieval period. More information and analysis of the NVAP data is needed before we can correlate the medieval pattern of settlement with the geological history of the region.

In the survey of the island of Kea emphasis was put on the presence or absence of small rural sites, most probably the remains of single family farmsteads, which point to variation in the agricultural strategies pursued (Cherry et al. 1991). This interpretation relies on Paul Halstead's discussion of Mediterranean agricultural systems (Halstead 1987). Halstead draws a distinction between traditional Mediterranean agricultural practices and an "alternative system" that may have operated in earlier periods. Cherry et al. (1991:463, table 22.1) and Davis (1991:138) summarize the main features of the two systems. In the traditional system wheat and barley are the main crops, with local specialization in vines and olives. In general it is underproductive since it is characterized by bare fallowing on a two year rotation. It is also characterized by scattered land holdings, a result of partible inheritance. Transhumant pastoralism

is associated with the traditional system. The implication of the seasonal removal of livestock from the arable lowlands is that manuring cannot be a viable option to improve soil fertility. On the other hand, in the alternative system grain crops are rotated with pulses and animals are tended in small herds, making the manuring of fields more feasible. The alternative system is intensive, because the rotation of cereals with pulses requires more labor, but it also raises the overall crop production.

The importance of these two different agricultural regimes for survey archaeology are the distinctive patterns of residence they imply. If traditional extensive farming is integrally related to the traditional nucleated pattern of settlement, dispersed settlement in farmsteads and villages located nearer to the arable land might well be associated with more intensive farming. Even if some of the small rural sites located by surveys are not permanent farmsteads, the presence of archaeologically visible field-houses may have rather similar implications for the intensity of land-use. Rural residence resulted in more sites as well as in the deposition in the landscape of a great quantity of artifacts. Indeed the widespread "background" scatter of pottery, often called "off-site material", reflects intensive agricultural activity and was perhaps largely created by manuring or middening (Halstead 1987:83). Demographic factors could also be a determinant, since increased rural residence may reflect an increase in population density. This would lead to a reduction in the size of individual holdings, a result of partible inheritance. An intensive farming strategy would help to raise productivity on smaller holdings.

The two different agricultural strategies may also reflect different patterns of land ownership. The labor-intensive strategy of the alternative model would be advantageous when the holdings are small and subsistence agriculture is the goal. On the other hand, in periods when an elite minority has control of the land the intensification of subsistence agriculture is constrained and rural residence discouraged (Davis 1991). An example which illustrates this point is provided from Kea. In the second half of the nineteenth and early twentieth century there occurred on the island a considerable dispersal of residence away from the main settlement of Chora, accompanied by the foundation of family farms. Factors that contributed to this change were the dissolution of monastic estates and the sale or rental of a substantially greater quantity of farmland, along with the departure from the island of the traditional landed aristocratic families, following the establishment of the Greek monarchy (Sutton 1991). Thus, ultimately, it was the radical transformation of the social structure of Kea that lay behind all the changes that facilitated the adoption of this new pattern of settlement (Davis 1991:199-200). Davis argues that the choice of production strategies is not directly related to overall levels of population.

The Medieval Period

It would be of interest to examine how these issues relate to the pattern of settlement of the medieval period in Nemea. The term medieval, in this discussion, refers to the Middle and Late Byzantine periods, that is from the ninth to the fifteenth centuries AD. The methodology, procedures and general results of the Nemea survey have been presented elsewhere (Cherry et al. 1988; Wright et al. 1990). A detailed presentation of the medieval archaeological material from the Nemea survey was included in my dissertation (Athanasopoulos 1993). Here, I will simply summarize the results, focusing on the medieval settlement pattern.

The area covered by the Nemea survey is approximately 85 sq km. The total number of sites defined with intensive procedures is approximately 80 (Figure 5.1). The sites range in date from Neolithic to Early Modern. Periods most abundantly represented are the Archaic, Classical, Hellenistic, Roman and especially Byzantine, a term commonly used instead of medieval. Sites occupied or in use during a single period only are the minority; most are multi-period sites with material diagnostic of several chronological periods. At least 58 sites have produced some amounts of Byzantine pottery, usually coarse wares, and in about 26 of them Byzantine pottery predominates. The most common type of site consists of a small scatter of tile, with fragments of cooking and storage vessels, small quantities of fine ware, and occasionally quernstones or olive presses. Many of these may represent remnants of farmhouses or other rural agricultural installations. The size of such sites is small. Site 602 is quite representative. It covers an area of approximately 120 by 60 m, and has yielded pottery of predominantly Byzantine date. There are also two very large sites (600 and 704) that emerge as the major settlements in the area. Site 600 covers an area of 400 by 500 m and about 1500 artifacts were collected from the site. Site 704 covers an area of 1000 by 350 m and 1806 artifacts were collected from it. One kiln site (510) is clearly of Byzantine date. There is a complex of sites of medieval and post medieval date on the fortified top of a precipitous mountain, Polyphengi, which is well known from historical documents (Kordosis 1981). At the top of this mountain there is a well-preserved tower and fortification walls, cisterns for the collection of rainwater and extensive collapsed remains of a large village spread over the plateau top. Among the steep cliffs there is a 40 m-long walled rock-shelter, whose interior was plastered and painted in the past, but now only a small part survives. There is also a seventeenth century monastery which is now abandoned (Site 901 and 910 is the settlement, 902 the fort, 900 the Monastery).

To summarize the results, there is no archaeological evidence recovered by the survey for the earlier phase of the medieval period until the eleventh century AD. In contrast, material dating to the late eleventh, but especially the twelfth and the thirteenth centuries AD is abundant. Nearly one field in three throughout the survey region contains pottery of this period. Overall, the density of sites is higher in the southern part, although small sites occur throughout the study area.

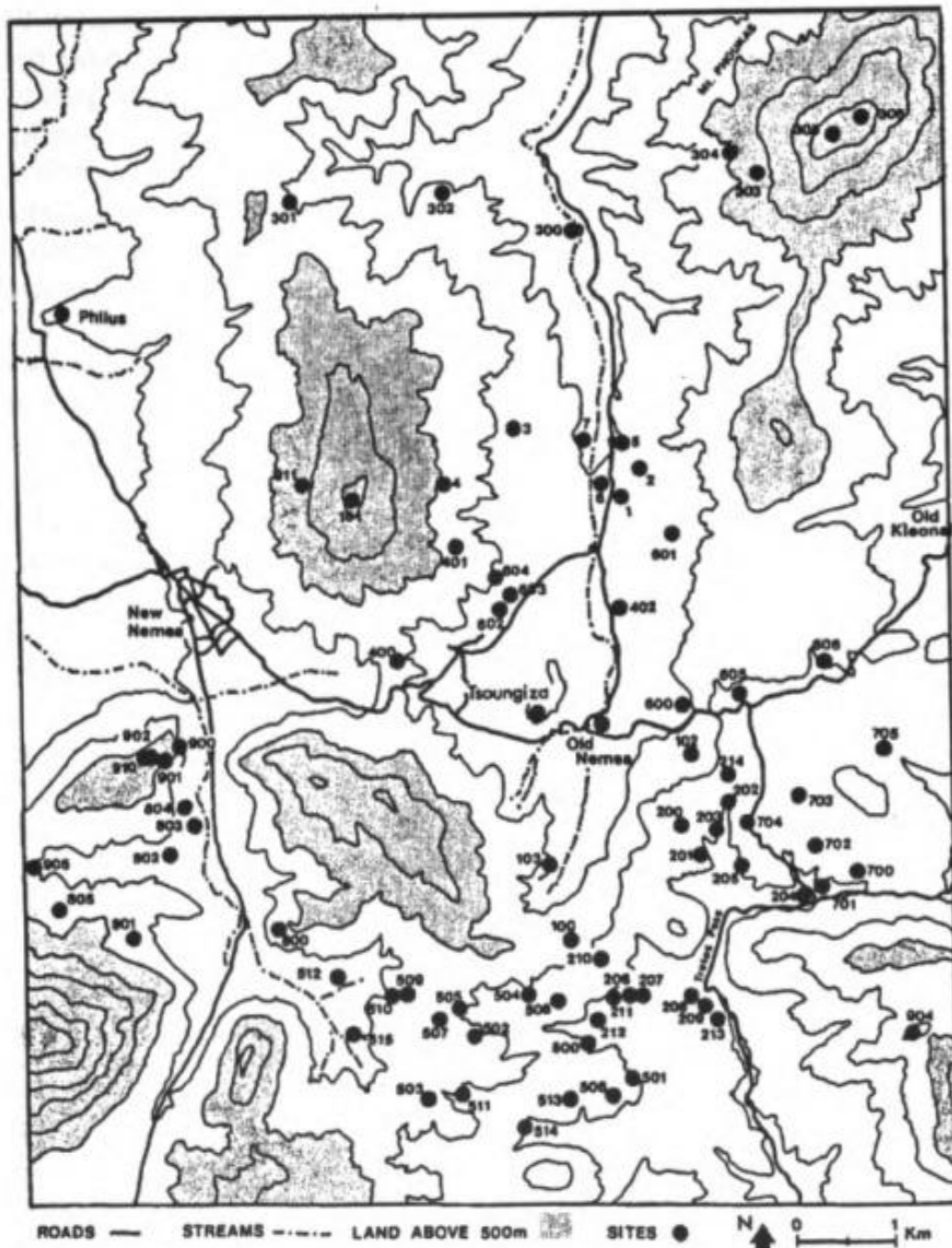


Figure 5.1. Distribution of the sites recorded in the course of the Nemea Valley Archaeological Survey.

The main characteristics identified by the survey are *general dispersal* and mostly *small size of settlement*. Despite the fact that two sites of considerably larger size date to the same period, there is no clear central place within the study area until the late thirteenth-early fourteenth century, when the complex settlement system on Polyphengi emerges. The small dispersed sites are most probably the remains

of farmsteads and are associated with intensive cultivation of the land. This leads us to presume that agricultural practices and habitation during the centuries that the Byzantine ceramic collections from Nemea document, must have been organized quite differently from the traditional Greek pattern of the past two centuries. A pattern of nucleated settlement is described in many travellers' accounts of the eighteenth-nineteenth centuries, a topic I will return to below.

One of the challenges that surveys like NVAP face is to interpret surface finds, to connect patterns of settlement with agricultural strategies, examine the environmental impact of land use practices and possibly make inferences about patterns of land ownership. Admittedly, the last task is not an easy one.

In several studies dispersed settlement has been consistently associated with an intensive agricultural system. Drennan (1988) deals with the same issue in a New World context, in Prehispanic Mesoamerica. He uses the terms dispersed and compact settlement rather than nucleated. Drennan accepts that compact settlement is the norm in Mesoamerica. The question then is why were Late Formative and Classic Maya settlements so much more dispersed than those of other periods and regions in Mesoamerica? He suggests that community size is not the only or the most important force driving settlement and that factors like defense do little to help us understand the variation in residential density. It seems that the principal reason for dispersed settlement is the intensive nature of the agricultural system in the southern Maya lowlands (terraces, ridged fields); and it is the heavy labor requirements of intensive agriculture, along with the concentration of those requirements continuously in a small area, that make it desirable for households to disperse themselves so as to be near the land they farm.

Similarly, in the early Northern Anasazi Southwest (Kohler 1992) small, seasonally occupied sites called fieldhouses represent an intensification of agricultural effort, that developed in response to increasing competition over arable land due to population growth and aggregation. It is also suggested that they may have developed as a means of laying claim to especially good agricultural land. In this case, the founding of a fieldhouse may have been viewed as an overt symbol of ownership. Fieldhouses probably had multiple systemic uses. Kohler emphasizes those aspects that imply an enlargement or extension of the concept of ownership, in other words with laying claim to land than with minimizing travel time.

Returning to medieval Nemea, the challenge is to connect the *local* level, the trends in demography and food production that can be discerned through survey, with the *regional* level, where the control of local productive forces by provincial social groups operates, and the *macro-regional* level, which corresponds to the utilization of the region by the central authority (Bintliff and Snodgrass 1988:215).

Lack of specific information at the regional level makes the task quite difficult. Nevertheless, the general trends are well documented and indicate that

acquisition of land by powerful local elites increased and intensified in the eleventh and twelfth centuries (Hendy 1989:18; Harvey 1989:71). The growth of large estates, both ecclesiastical and lay, transformed most peasants into dependent farmers (Charanis 1948; Laiou 1977). This process varied considerably from region to region. This could be best described as a *feudalization process*, which is believed to have led to economic stagnation, weakening of central control, and eventual disintegration of the Byzantine state in the late twelfth-early thirteenth century, under the pressure of the Fourth Crusade in 1204. But instead of economic stagnation, more recent interpretations of the written sources (Harvey 1989) along with evidence from surveys reveal *economic expansion*. In the rural countryside this takes the form of intensive agriculture and of new land brought under cultivation.

Harvey (1989) has described a trend toward the reclamation of agricultural land and expansion of the overall area under cultivation in the eleventh and twelfth centuries. He argues that a much neglected factor in the development of large properties was a growth in population. Large landowners, who had the resources to bring extensive tracts of land under cultivation, were able to absorb landless peasants on their estates. By settling them on their properties large landowners were helping to extend the area under cultivation, a very clear indication of an increase in population (Harvey 1989:47-48). From monastic archives in northern Greece we learn that between the mid-eleventh to the early fourteenth century there was extensive settlement of landless peasants in the ecclesiastical estates (many examples are discussed in Harvey 1989:50-55). The density of population and the chronology of its increase varied considerably from region to region (Harvey 1989:245). The important point is that the expansion of large properties occurred partly at the expense of peasant smallholders and was partly the result of an increase in population. The result of this process was that a larger proportion of the rural population became dependent producers (Harvey 1989:78-79).

Laiou (1977) has given us a very detailed picture of the situation in the countryside in the late thirteenth and especially in the fourteenth century based on the rich documentation preserved in the Athonite monastic archives of northern Greece. It is a study of the effects of feudalization upon the productive capacity of the peasant and the demographic development of rural society. The peasant of this period is known as *paroikos*, a dependent peasant. The numbers of *paroikoi* increased as groups of families or entire villages were granted to the landlords, the most wealthy landlord being the church. It is most probable that the great bulk of the peasantry of the Late Byzantine empire did in fact consist of dependent peasants, and thus lived in conditions similar to those which the documentation from northern Greece suggests. Even the serfs of the Latin possessions in the Morea (Peloponnesos) lived and worked in conditions which combined Byzantine and Western feudal practices. Thus the conclusions reached from a study of monastic *paroikoi* have wider application than the strictly defined

geographical area which is covered by the Athonite sources. On the basis of the preserved sources Laiou is able to arrive at a tentative estimate of the population density, 34.3 persons per sq km (about half the modern density), a figure which suggests that the countryside was fairly thickly settled.

We are not in a position to say if there was a powerful local elite, ecclesiastical or lay, that controlled most of the land in the Nemea region, due to lack of documentation. The survey evidence points to a proliferation of small sites in the eleventh-thirteenth centuries AD in Nemea which must reflect the intense level of agricultural activity in the countryside at the time. Such a picture is also supported by the documentary evidence that exists for central Greece.

An important document which reveals the pattern of land ownership in central Greece is the *cadaster of Thebes*, an official copy of a cadastral and fiscal register dated to the second half of the eleventh or the first quarter of the twelfth century (Lemerle 1979:193; Svoronos 1959). The Theban records list the taxes due on each property and they provide evidence of each owner's resources: his titles, family, and property. They reveal a complex pattern of land ownership with scattered, small land holdings and dense settlement. These records also reveal the economic base of richer families: the titles which some landowners held suggest that these were individuals who belonged to the local elite (Harvey 1989:74; Herrin 1985:245; Lemerle 1979:198). What the tax register also documents is considerable social differentiation which lies behind the emergence of identifiable families. The existence of great unitary estates cannot be deduced from the land register, although certain entries cover a substantial number of lots. Overall, the view derived from the tax register is that demand for land was increasing and that agricultural production intensified (Hendy 1989:12).

In spite of the strict regional limits of the Theban tax-register, it does reflect general trends in the rural economy. In other areas of the Byzantine empire entire villages and estates were conceded by the state to individual landowners. Where the state did not make concessions on such a scale, as in the region covered by the Theban tax-register, the accumulation of property occurred in a more piecemeal way, leading to a less consolidated pattern of landownership (Harvey 1989:74, 78). Our results from Nemea are consistent with this picture where the scale of land ownership was rather small and fragmented. Despite the fact that we have no specific documentary information about land ownership in the Nemea area, the archaeological evidence indicates that it was well populated and intensively farmed.

To a certain extent, similar results have been obtained by some other surveys: Boeotia in central Greece (Bintliff and Snodgrass 1985), Limnes-Berbat survey (Wells et al. 1990:233), and the Southern Argolid survey (Runnels and van Andel 1987; Jameson et al. 1994). The latter two projects took place in the same broad region as NVAP, the NE Peloponnesos, but local conditions and the observed patterns are by no means uniform.

Other factors, namely *political organization* and factors related to *defense* and *security*, also play an important role in the choice and location of settlement. It is clear that dispersed settlement is vulnerable to the effects associated with prolonged periods of weakened central authority. After the Latin conquest of AD 1204 the political and social structure of Byzantine Greece became extremely fragmented and decentralized (see Kardulias, this volume). Especially from the middle of the fourteenth century on, Byzantine society was severely disrupted by civil wars, invasions and possibly the plague. The narrative and documentary sources all attest to the demographic decline and the impoverishment of the peasant population (Laiou 1977:223). Some documents dating to AD 1354 give us some general information about Peloponnesian demography of the fourteenth century (Longnon and Topping 1969). They reveal a considerable number of households without children (Panagiotopoulos 1985:42-3) and lead to the conclusion that the population was barely reproducing itself and could hardly cope with a crisis of any magnitude, such as the plague of AD 1347 which seems to have had devastating effects in Messenia according to Venetian sources of the period (Panagiotopoulos 1985:65). There are also frequent references to deserted holdings, *staseis*, in these documents. In general, scholars who deal with this period argue for a demographic crisis and depopulation of the countryside in the fourteenth century, especially its second half (Antoniadis-Bibicou 1965; Longnon 1965; Panagiotopoulos 1985). They attribute the depopulation of the countryside to prolonged conflict and warfare between the Franks and the Byzantines and to the Turkish incursions. In the Nemea region, the lack of widespread archaeological material from the fourteenth century onwards points to a marked reduction in rural settlement and significant decrease in the intensity of cultivation.

Overall, the main characteristics of the thirteenth-fifteenth centuries are political fragmentation, continuous conflict, and competition. This situation encouraged the multiplication of fortifications and the concentration of the population near them at the expense of the dispersed farmsteads. The characteristic type of settlement that emerges is that of a large fortified village. In the Nemea area the settlement on the mountain of Polyphengi grew during this period (Sites 901, 910). Polyphengi is mentioned in a variety of sources (Kordosis 1981:176-184, 368-372). The castle at the top of the mountain along with the settlement (part of it on the mountain and the other part at its foot) are known under a number of different names. The most common names are Polifant, Agios Georgios, San Giorgio, Sancto Giorgio de Polisengo, and S. Zorzi Tropico. The castle was mostly under Frankish control and served as the center of a small area for the collection of taxes (Longnon and Topping 1969, document IX, 174-75, 179, 182, 185). It is also mentioned in various lists of castles which date to AD 1377, 1450, 1467, 1469, and 1471 (Kordosis 1981:183; Bon 1969).

Thus, factors related primarily to political organization, defense and security, rather than simply economic ones, led to a complete reversal of the settlement

pattern in the Nemea area from a dispersed to a nucleated one. The fortified village on the mountain of Polyphengi emerged as the center of the region during this time.

The Post-Medieval and Pre-Modern Period

Another factor that must have had a significant impact on the settlement pattern and the population was the incorporation of Peloponnesos into the Ottoman empire, accomplished between AD 1457 and 1460. The contemporary historian Chalcocondyles mentions a forceful transfer of inhabitants from the Nemea area (Polyphegos and Roupeli) and from Arcadia to the vicinity of Constantinople, although he does not give precise figures. Another historian, Doukas, mentions that 2,000 families were transported from Peloponnesos to Constantinople (Panagiotopoulos 1985:105). The number of inhabitants of Peloponnesos in AD 1520/1530 is known from a series of censuses published by Barkan (1949-1950) and discussed by Panagiotopoulos (1985:118). These sources mention a total of 50,941 households, of which 49,412 were Christian, 1,065 Muslim, and 464 Jewish. But there are no comparable data from the later sixth century, or the seventh century other than occasional references in travellers' accounts. For example, Randolph, who visited Peloponnesos between 1671 and 1679, mentions 90,000 Christian and 30,000 Muslim inhabitants (Randolph 1689:15). The Ottoman era put an end to the political fragmentation of the previous period. The unification of the country led to the expansion of cultivation, to possible demographic growth (Barkan 1957), and to the decline of the fortified settlements that played such a central role in the preceding period.

There is no archaeological information from the fifteenth century on in the Nemea area, a situation that has been encountered in several other areas investigated by archaeological surveys (S. Argolid, Kea). Two reasons can partly explain the lack of post-medieval rural remains. First, our inability to recognize archaeological material dating to these centuries because the study of coarse and utilitarian pottery of this period is just starting. Second, currently inhabited settlements cover the remains of the earlier period. The settlement of Agios Georgios must have grown during the Ottoman period, from the fifteenth century on, after the decline of the settlement at the top of Mt. Polyphengi or Polyphengos. This pattern emerges from the scattered references to the town in various sources. In late medieval documents the names of Polyphengos and Agios Georgios are used interchangeably, which points to a double settlement, on the mountain and at its foot. In the sources of the Turkish period, after the castle was abandoned, only the name Agios Georgios is mentioned (Kordosis 1981:184; 1986). A Muslim traveller, Evliya Celebi, who visited the area in 1668, mentions 100 houses of Christians at the foot of the mountain:

The castle of Ai Giorgi: First we came to Ai Giorgi that is two hours away from Corinth (Kordos). In the days of the sultan Mehmet it had been conquered and deserted (destroyed). There is a small castle on the rock. At the foot of the mountain there is a village of infidels with 100 houses. (Kostaki 1980-81:292)

The town of Agios Georgios (modern Nea Nemea) has remained the major demographic and economic center of the area up to the present.

Information relating to settlement can be extracted from the diverse documentary material from the end of the seventeenth-early eighteenth century (AD 1685-1715). During this brief period the Venetians gained control of the whole Peloponnesos. There are censuses, the most complete one dating to AD 1700, and very useful information about the general conditions, resources of the country, agricultural practices, attitude of the people, etc., which are contained in the reports of the Venetian officials (Topping 1972; 1974; 1976a). The Venetian census of AD 1700 mentions 43,366 households (Panagiotopoulos 1985:125). The Korinthia, to which the region of Nemea belongs, was omitted from the earliest Venetian enumerations of population. Domenico Gritti, one of the three officials sent by the Republic to organize the "entire financial administration and land regime" of the Morea, noted circa 1691 that it contained large quantities of uncultivated land.

For the area under consideration, the Nemea Valley and vicinity, the settlement names that are mentioned in these sources are places that still exist today, with very few exceptions (Panagiotopoulos 1985:241). In particular the Venetian census of 1700 seems to have been quite detailed and thorough. For the whole Peloponnesos, the document lists 1532 towns and villages, 133 monasteries and 47 settlements with 1 or 2 families (Panagiotopoulos 1985:183-197). These data indicate that nucleated settlement was the norm and dispersed farmsteads a rarity. The population density was 8.4 inhabitants per sq km (Panagiotopoulos 1985:170). This figure can be contrasted with the 34.3 inhabitants per sq km that Laiou calculated for the Athonite monastic estates in the fourteenth century AD (Laiou 1977:43). Thus, the AD 1700 Venetian census indicates that Peloponnesos was considerably underpopulated. The density of population in the provinces of the eastern part was considerably lower in comparison with other regions of the peninsula (Panagiotopoulos 1985:175, map 7). It appears that the Peloponnesian family was of small size, the mean for the Corinto territorio being 4.1 (Panagiotopoulos 1985:204, table 29). Also, several comments contained in the reports of the Venetian officials emphasize the depopulated state of the peninsula. The officials constantly remark on the scarcity of cultivators in the fertile plains. They took immediate steps to repopulate the country by attracting new settlers (Topping 1976a:93). One of the officials, Domenico Gritti, who served from AD 1688-91, provides details about *agricultural practices*. He observed that a three course rotation of crops was employed; while one-third of the land lay fallow, another third was sown in the principal cereals (wheat, barley, oats, rye and flax) and the remaining third in

lesser cereals like millet and white maize (calambochi) as well as in cotton. Thus, each third was put to different use every year. It is not clear, however, how widespread this system was (Topping 1976a:94). The Venetian official also mentions that the benefit of digging irrigation channels and of manuring the lands is entirely unknown (Topping 1974:317).

Several travellers who visited the Nemea area from the eighteenth century onwards, mostly because they were interested in the Temple of Zeus located in the Nemea Valley, provide a great amount of information, though of variable quality (Aldenhoven 1841:399; Chandler 1776:231; Clarke 1814:714; Dodwell 1819; Gell 1817; Leake 1830; Poqueville 1826). Their accounts suggest that habitation at this time was restricted to the main town of Agios Georgios (St. George) and a few other smaller settlements. Dodwell, an Englishman who visited the area in 1805, mentions that he "passed through the large and populous village of Saint George, inhabited by Greeks, and swarming with pigs, a sure sign that no Turks lived in the vicinity" (1819: 211). Then he goes on to describe the cultivated plain near the town, known as the plain of Phlious, and mentions extensive vineyards, currant plantations and corn land. He remarks that it produces the best wine in the peninsula. His narration is full of interesting stories, for example about a venerable hermit inhabiting a cave which Dodwell thought might have been the den of the Nemean lion (1819:212). Leake describes "Ai Ghiorgi" as "a kefalokhori of two makhalas", containing together 200 households, which own half the land of the subjacent plain, while Nuri Bey has the other half. The plain of St. George produces corn and vines. The town is said to be more healthy and to enjoy a better climate and temperature than either Argos or Korinthos (Leake 1830:336-7). The same number of houses, approximately two hundred, is mentioned by another traveller (Burgess 1835:173).

Dodwell also visited the Nemea Valley and describes it as an uninviting and deserted place. He found the area around the Temple of Zeus to be more characterized by gloom than most of the places he had seen. In his description he uses phrases such as "dreary vacancy of death-like solitude", "we saw no living creatures but a ploughman and his oxen ...there is not a single tree in the whole plain, and only a few bushes around the temple" (Dodwell 1819:209-211). He also provides information about the environmental conditions prevalent in the valley:

The country around this place is remarkable for its humidity; and I believe that all the inhabitants, without a single exception, were afflicted with violent colds and coughs, as in England, which surprised me the more, because coughs are unusual in this southern climate. (Dodwell 1819:209)

William Mure of Caldwell describes the defiles of Nemea as a dangerous place frequented by bandits (1842:vol. 2:144 ff) and like Dodwell he was also struck by the solitude and desolation of the surroundings (William Mure of Caldwell

1842:154-155). The valley seems to have become a marshland in the post-medieval period with the gradual blocking of the outlet of the Nemea river in the north of the valley, as indicated by auger cores and geomorphological work undertaken by NVAP. Maybe land abandonment played a role in this process. The situation changed when in 1883 a French engineering team drained the valley (Miller 1990:13-14, 96).

Another traveller describes farming practices of the early nineteenth century:

I...crossed the mountain, or rather hill, on the left, in order to visit the ruins of the temple of Jupiter at Nemea. They lie in an open valley about five miles long, and one and a half broad, (to judge by the eye) for the most part cultivated, but without habitation. The Greek or Albanian peasant, for the latter seem to be scattered everywhere, sows his land, and leaves it with scarcely any attendance till harvest, when he erects a hut, in which he resides till he has reaped and carried away the produce, living the rest of the year in the towns, or in villages, where he may unite with his countrymen for mutual protection. It is better thus to snatch what nature will give, than to obtain at more expense a larger quantity subject to the extortion of the Turks. (Woods 1828:vol. II, 301)

What emerges from these sources is the common "traditional" pattern, that of nucleated settlement. The "traditional practices" and settlement of the pre-modern period in Nemea contrast sharply with the picture that is emerging for the medieval period, especially the eleventh-thirteenth centuries AD. The traditional pattern cannot offer analogies for the interpretation of the medieval settlement pattern, which appears to have been quite different, characterized by dispersed farmsteads and intensive cultivation. This observation helps to remind us that caution should be exercised when traditional analogies are offered as models for not only the prehistoric but also the historic past. In the case of Greece the use of such analogies has been quite common and to a large extent arises from a romantic notion about the unchanging nature of rural Greek life and the Greek landscape in historic times. Fortunately, the results of intensive archaeological surveys are changing this picture and provide a new perspective that is forcing us to think about the actual long-term processes that have affected the development of rural settlement.

Conclusion

In this paper I have discussed the medieval settlement pattern in the Nemea region. The archaeological evidence for the eleventh-thirteenth century AD in the Nemea area reveals a pattern of dispersed settlement, associated with an intensive agricultural regime. In contrast, there is extreme scarcity of archaeological material dating to the post-medieval/pre-modern periods. Documentary evidence and travellers' accounts also suggest that habitation at this time was restricted. From the fourteenth century on dispersed settlement ceased and was replaced by

nucleated settlement. The shift from a dispersed to a nucleated pattern is here attributed to social and political factors, namely conflict and the extreme fragmentation of the social and political structure of the Peloponnesos following the Latin conquest. The settlement shift in the Nemea area, along with decreasing population, must have had considerable impact on the landscape, with land abandonment being the most visible change in the post-medieval and pre-modern periods.

Surveys, including NVAP, have initiated an effort to correlate shifts in settlement patterns and land use practices with the geological history of regions. Thus, increasingly, localized soil erosion and alluviation episodes are being attributed to anthropogenic factors. Furthermore, variability in rural settlement across regions is the most consistent theme that archaeological surveys reveal. As Bintliff suggests, maybe the best approach in dealing with pre-industrial empires, in this case the Byzantine empire and the polities that succeeded it, is to view them as agglomerations of discrete regions, welded together by central political forces but not well integrated at the economic level (Bintliff 1991:130), thus allowing a lot of room for semi-autonomous developments. So, rather than seeking to generalize, I would like to stress the importance of the interaction of local and external forces in attempting to understand regional developments.

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RECONSTRUCTING MEDIEVAL SITE LOCATIONS IN THE KORINTHIA, GREECE

P. Nick Kardulias

Introduction

The Korinthia, in the northeastern Peloponnesos, Greece, has been a major cultural crossroads for three millennia. Perhaps the least studied period in that span is the Medieval era. One goal of the Korinthia Regional Research Consortium (KRRC) is to determine the regional settlement pattern at various times in the past. Although we have a great deal of information about major urban centers in the region in antiquity, our knowledge of Medieval settlements, and particularly the rural landscape, is deficient. The current focus of the KRRC is the Frankish (thirteenth-fourteenth centuries) settlement system and involves detailed study of individual sites and reconstruction of the regional scheme with Geographic Information Systems (GIS). The work encompasses analysis by archaeologists, ethnohistorians, and landscape architects. The GIS component evaluates settlement location based on a number of factors, including proximity to prime range and agricultural land, and key topographic features such as elevation and aspect. In addition, the study utilizes information gathered by cultural anthropologists on modern land use to compile a sequence of human interaction with the landscape, beginning with the period for which we have the most information and moving progressively back in time to eras for which data are less available. The modern data provide a reference point against which we assess the historical and archaeological information. To date, the evidence indicates that the residents of the Korinthia have shifted their settlements, but only within a narrowly defined zone in each locality because similar factors affected modern and Medieval land use. Below I will examine some of the conceptual bases for the study of a region and then focus on the GIS analysis of the Frankish Korinthia. Distribution of sites over the landscape, the relationship of rural to urban settlements (Ince et al. 1987), and the network of ties that derive

from differences in site functions are just some of the important questions that remain to be studied.

Interdisciplinary Studies

Through an interdisciplinary focus, scholars can investigate the interplay of various forces that determine site location and function over time. Such analyses consider human settlement as elements of the landscape, and, thus, it becomes necessary to think of the environment, the ecological setting, in cultural as well as topographic terms. Such an approach can provide an interactive model of humans and the terrain they occupy. The method entails a number of assumptions, with consequent ramifications for research. The key assumptions include the following: (1) Humans select settlement locations on the basis of a rational calculus, i.e., they choose to occupy or use selected portions of the environment available to them on the basis of an economizing principle. Site selection is just one element in the large panoply of decisions people make in an effort to satisfy basic needs; they choose locations they believe will help them solve some basic problem. Typically, they desire to resolve the problem (e.g., access to water, need for defense, etc.) in a manner that minimizes the cost to the individual or group (Lenski 1970:32-33). The work of economic anthropologists explores and presents some of these basic premises. (2) The forces that govern such selection are common to all periods. Thus, we can project contemporary models of human behavior into the past. This uniformitarian perspective argues that the process of rational decision-making crosscuts different historical periods and different cultures, i.e. it is a universal feature of humanity. (3) I subscribe to a materialist approach that assigns priority to infrastructural elements such as modes of production (subsistence) and reproduction (Harris 1968, 1979). If as social scientists we aspire to gain a clear understanding of how cultures, past and present, function, an investment in studying the economic structures underlying social behavior pays substantial rewards. Each of these points underlies the discussion below.

To undertake such an analysis requires several different types of information. First, it is important to isolate known or potential sites. This can be accomplished by several means. Many sites are known in the archaeological and historical records. Casual discovery and identification of sites has been supplemented by systematic archaeological survey. In Greece and throughout the Aegean, such surveys over the past 20 years have focused on the recording of sites from all periods (Bintliff and Snodgrass 1985; Cherry et al. 1991; Gregory 1985, 1996; Jameson et al. 1994; Kardulias and Gregory 1989; McDonald and Rapp 1972; Renfrew and Wagstaff 1982; Wright et al. 1990). Written records (chronicles, tax documents, cadastral maps) provide critical data that help position the sites in their historic regional and economic contexts. It is not always possible to tie

together sites mentioned in historical documents with archaeological remains, but when this is possible we enrich the data base significantly. Archaeologists have also turned to various models to predict the locations of unknown sites. Such efforts have taken the form of central-place and gravity models. This paper will demonstrate the utility of GIS in conducting such an analysis of settlement patterns. From a knowledge of recorded sites, GIS evaluates settlement location based on a number of factors, including proximity to prime range and arable land, water, roads, etc.; other factors of interest are elevation, soil types, and aspect. The GIS correlates these factors and isolates a characteristic signature, or recurrent pattern. The program then searches for and identifies other locations within the region with similar patterns. Field work can check the validity of the locational predictions.

Studies of contemporary conditions provide the other empirical base. Cultural anthropologists who study modern land use practices and settlement distribution offer an indispensable degree of detail concerning the strategies modern people pursue. Ethnoarchaeologists supplement such data with their detailed recording of modern sites in the effort to discern behavioral correlates of the static material record in order to augment our inferences concerning past activities. Together, these studies provide the basis for the models archaeologists employ in their effort to comprehend the past.

Region as a Concept

The unit of analysis in the present study is the region. Of considerable concern for archaeologists over the years has been the problem of how to delineate the spatial elements they study. In one of the first and most influential systematic discussions of this issue, Willey and Phillips devised a hierarchy of size. Their system recognized as the smallest unit the site, defined as "fairly continuously covered by remains of former occupation... [of] a single unit of settlement" (Willey and Phillips 1958:18). Next in extent is the locality, "a geographical space small enough to permit the working assumption of complete cultural homogeneity at any given time" (Willey and Phillips 1958:18). A region encompasses a space that could be settled by a "social unit larger than the community" (Willey and Phillips 1958:19). A region also constitutes a particular physiographic unit. The largest unit, the area, is a major physiographic zone (e.g., the Great Basin, the Levant, or the Aegean Basin). The Willey and Phillips system owes at least some intellectual debt to the concept of culture area, defined initially by Clark Wissler (1917), and modified by Kroeber (1939) and Steward (1955). The basic underlying notion is that an area, with its peculiar set of environmental factors (e.g., climate, terrain, flora, fauna) provides people with a set of options or parameters from which humans will choose, and in so doing, they will create or alter their culture. The culture is fairly uniform over a broad

geographical expanse, with a central set of distinguishing traits; at the margins, groups exhibit fewer of these key traits.

Flannery (1976) developed a complementary system specific to the Mesoamerican area. His scheme includes at the simplest level the activity area, defined as "a single locus of activity of one or more members of a community" (1976:5). The next level in spatial organization is the house floor, made up of several activity areas and immovable features. Third is the household cluster, a single house and its associated features and activity areas. Groups of houses can form either a courtyard group, with several houses around a common patio, or barrios, defined as "related courtyard groups whose architecture, material remains, and other attributes may distinguish them from neighboring barrios" (Flannery 1976:5-6). Borrowing from Vita-Finzi and Higgs (1970), Flannery defines the catchment area as the next level. A catchment area is that zone around a site from which residents extracted most or all of the materials necessary to sustain themselves; typically, the resources are located within a reasonable walking distance from the site. Settlements and their catchment areas generally articulate in a larger system of regional interaction. Systems of trade integrate these systems at higher levels and over wide zones (interregional interaction; see Schortman 1989; Schortman and Urban 1987, 1992).

Dancey (1981:14-15) notes that while these two systems have significant overlap, they are intended to investigate different problems. The Willey and Phillips system concerned itself with chronological issues in a culture-historical context, while Flannery's approach stressed functional aspects in a synchronic setting. In a concise assessment, Dancey points out the Willey and Phillips system focuses on the unique events that influence the record at a particular site; these individual events coalesce to form the culture histories of the larger subdivisions. Flannery's approach focuses on intrasite structure and the patterns of human behavior. Willey and Phillips focus on "units of chronological synthesis," Flannery on "units of social interaction" (Dancey 1981: 15). One can argue that Willey and Phillips are descriptive in their work while Flannery's attempts to be explanatory fit his processual temperament.

The definition of region used in this study takes certain elements from each of the above approaches. The geographical component is important to provide a spatial baseline. Regions are bounded by both physiographic and cultural boundaries; the latter include political borders set by units such as tribes, chiefdoms, and states. The former encompass streams, coasts, and hills or mountains. To some extent, the physical features foster or facilitate interaction among the people in a region and enhance the shared nature of the cultural milieu. Functional attributes of the sites are also of critical importance, and inform us of the nature of the settlement hierarchy. Catchment area is a central concept because the medieval sites which are the crux of this study drew on resources from a variety of locales; the enhanced transportation available because of horses and other means of transport expanded the range of the catchments. In

addition, the catchments reflect the interests and needs of Frankish lords—settlement structure and function were in part governed by the dynamics of social inequality.

The Frankish Period In Greece

Frankish hegemony in the Peloponnesos and Greece was an outgrowth of the Fourth Crusade, during which western knights sacked Constantinople and then installed themselves as feudal princes in occupied Byzantine territory. The mutual suspicion and dislike between the peoples of the east and west played out in a savage looting of the great capital in April, 1204. A contemporary historian, Nikitas Choniates, described the rapacious knights, compared to whom "Even the Saracens are merciful and kind" (in Ostrogorsky 1957: 370). Ostrogorsky (1957: 375) describes the dismemberment of the Byzantine Empire by the Crusaders as "ruthlessly deliberate." By agreement between the western lords and the Venetians, who had subsidized the Crusade in order to strengthen their hand in the Eastern Mediterranean, Count Baldwin of Flanders was made Emperor of the Latin Empire of Constantinople. Baldwin was to receive one-quarter of all imperial territory; the Venetians and western lords were to divide the remainder equally. A complex system of fiefs developed in many areas, while the Greeks retained control of certain regions such as Epiros, Nicaea, and Trebizond. Boniface of Montferrat became king of Thessalonika and supported various knights in the conquest of other regions; he aided William of Champlitte and Geoffrey of Villehardouin in subjugating the Peloponnesos, which became the French principality of Achaia or the Morea (Ostrogorsky 1957: 376). In the Peloponnesos the French followed a thoroughly western lifestyle. Many of the Greek Byzantine lords retained their *pronoias*, equivalent to western fiefs. For the agrarian commoners, little changed, except that taxes went to foreign landlords. The lords had to be wary not only of potential problems with the Greeks, but also with their fellow westerners who often sought to expand their influence and holdings. Thus, I would suspect that the nature of settlement distribution and individual site configuration and function were influenced by a series of socio-political factors. A resurgent Byzantine state recaptured Constantinople in 1261, but the reconquest of the Morea required over a century to complete. It would seem, then that the settlements had a consistent set of needs over a great number of years.

The Agios Vasilios Study

The Physical Setting

The Korinthia forms a physiographic region in the northeast Peloponnesos (see Table 6.1). On the north and east it is bounded by the Korinthian Gulf and

Table 6.1. Summary of Modern Land Use Data for the Korinthia.

Land Type	Area in All of Greece*		Area in the Korinthia**	
	hectares	% of total	hectares	% of total
Forests	5,970,000	46.3	n/a	n/a
Rangeland	2,490,000	19.3	16,676.75	25.9
Agricultural	3,960,000	30.7	19,823.00	30.8
Other	470,000	3.6	27,882.75	43.3
Total (ha)	12,890,000	100.0	64,382.50	100.0

*Source: Nakos (1983).

**Source: Dann (1992).

Saronic Gulf, respectively. These coasts provide excellent anchorages. In antiquity and early medieval times, two major ports served the northern Korinthia and the great commercial city of Korinthos. Lechaion was located on the coast of the Korinthian Gulf just west of the modern city of Korinthos, and Kenchreae was on the eastern coast, ca. 5 km south of the Isthmus. The northern edge of the region consists of a long, flat, narrow, but extremely fertile coastal plain. The Nemea River and a series of foothills leading into the Arkadian Mountains form the western boundary of the region. To the south and southeast, there are the Oneian Mountains and some upland plains near Sofiko and Agionori. The dissected terrain extends along the southern extremity of the region, and links with the western foothills. Through the southern mountains there are several major passes that provide egress to the Argive plain; the Dervenakia passes offered the most direct route between Argos and Korinth, while the passes near Agionori formed a back passage connecting the two major cities. The region contains a wide range of land forms, from coastal plains to rough hilly terrain. This physiographic and ecological diversity provided significant variation for cultural adaptation.

Site-Specific and Regional Analysis of the Frankish Korinthia

A regional study of Byzantine settlement in the Korinthia is a long-term goal of the KRRC. To this end, Ohio State University archaeologists have conducted interdisciplinary work over the past eight years. Most recently, the work has involved intensive recording of a late medieval/Frankish (13th AD) fortified settlement at Agios Vasilios in the southern Korinthia and a GIS analysis of the whole region. The ultimate goal is to record a number of medieval sites in the Korinthia in order to gain a clear image of the settlement hierarchy during this important, but neglected, period. The work at Agios Vasilios complements similar efforts by the KRRC at Sofiko/Mt. Tsalikas (Gregory 1996), Evraionisos (Kardulias and Gregory 1989; Kardulias et al. 1995), and Akra Sofia (Gregory 1985). In addition, the current project complements the work of David Romano, who has conducted a detailed topographic study of Ancient Korinthos using a total station (Romano and Schoenbrun 1993). Romano's pioneering study used AutoCAD software to model the layout of the ancient city, including the Roman centuriation system.

The site of Agios Vasilios, founded with defensibility as a key criterion, is located on the south slope of Mt. Dafnia (elev. 556 m). Kordosis (1981:173-4) attributes the location of Frankish Agios Vasilios to the commanding view of the Dervenaki and Agios Sosti passes and the fertile plain around the town of Kleonae. Bon (1969:636) dates the site to the early years of Frankish rule, based on similarities with fortifications at Kalavryta and Akova. Some scholars erroneously identified the fortifications as one of the places the Franks established during the siege of AkroKorinthos, 1205-8 (Kordosis 1981:176). The site name first appears in a document dated to 1365 that lists the feudal property of Niccolo Acciaiuoli, scion of a wealthy Florentine banking family. Agios Vasilios was the administrative center for the surrounding area; vassals of the lord collected taxes from the subjects in the form of agricultural produce. Agios Vasilios controlled a significant area, third in size after those of Korinthos and Vasilika. In 1377, the site appears (as *castello de Sancto Basile*) on another document as one of the nine castles in the Korinthia controlled by Angelo Acciaiuoli. The First Register, an important tax document (pp. 168-9, cited in Kordosis 1981:398), mentions the presence of 85 households at Agios Vasilios, second only to Korinthos's 330; a conservative population estimate, based on four persons per household, is 340 people. In 1463, the Venetians briefly gained control of the site; it is also mentioned in lists from 1467, 1469, and 1471. The site also appears on maps from the sixteenth, seventeenth, and eighteenth centuries (Kordosis 1981:175-6).

A laser transit topographic survey of the site over a period of eight days in 1991 and 1992 recorded the defensive circuit wall, 101 structures in the interior, and five retaining walls (Kardulias and Shutes 1992). There is a clear distinction between the Keep and its defensive features at the upper end of the site and the

other structures along the slope. The situation seems to reflect the socio-political hierarchy of the period. The settlement stretches along a slope that descends from south to north over 12 natural terraces which are reinforced by a series of walls (mostly back walls of buildings, but there are also a few independent retaining walls). The layout of interior buildings follows the natural contours. Structures come down to near the circuit wall on the east, but to only within ca. 25 m of it on the west. The larger and better preserved structures are located in the east central area, below the Keep, and may represent homes of more affluent residents. House walls are all made of limestone rubble, only occasionally mortared, with only a small number of roughly dressed blocks used in corners and along some walls. In some places, bedrock outcrops were cut to serve as wall foundations. Roof tiles were mixed with the stone rubble in a few buildings. Wall width varies from 0.50 m to 1.10 m, but clusters around 0.65 m. There are few visible architectural embellishments on the interior buildings, but one structure has a molded block; we also found a silver Ottoman coin (eighteenth century) in this building, evidence for the latest occupation.

The buildings seem to cluster into several distinct units or neighborhoods, with densest concentration in the east and center of the site. It is, in fact, possible to assign all the buildings to six distinct units, or neighborhoods, each with its own general orientation and concentration. Whether or not such concentrations had social or economic origins is not clear at present. Especially interesting is the series of buildings in the east central part of the site. These, at least ten in number, were constructed along the same line, and all looked out directly over the fortifications into the plain below. Another similar line of buildings can be seen in the northwest. The buildings all seem remarkably alike; they are roughly rectangular in shape, with their long axes running up and down rather than along the slope. Most of the buildings seem to have been free-standing, in the sense that there are few shared walls. Presumably, the preserved walls are from the ground floor of these buildings, probably used for storage and perhaps the sheltering of animals, while living quarters, possibly divided into individual rooms, would have been located on an upper floor (see Bouras 1982; Ince et al. 1987; Moutsopoulos 1985).

The defensive wall, towers, and Keep all exhibit similar construction techniques. The walls are made of limestone rubble, occasional large roughly dressed blocks, and abundant ceramic tile, all cemented with a coarse lime mortar. The circuit wall runs along the northeast, east, and south edges of the site; on the southwest, west, and much of the north the precipitous cliff forms a natural barrier to attack, and was not built up. There are two gates, one immediately west of Tower 1 at the lowest elevation (north end of the site). The other gate is at the high south end, 20 m east of the Keep. A ramp up from the saddle to the south led beneath the Keep, turned right (east) along a narrow ledge from which one turned left through the second gate. Once inside the outer wall the path to the Keep required another left turn, then right and left again up a narrow ramp between the

Keep and Tower 7. This tortuous route assured maximum defense of the Keep. Thus, at both the local and regional levels, defensibility was a primary criterion for Frankish architects.

Of the defensive features, only Towers 1 and 2 and the Keep are preserved above foundation level. The springers for the vaulted roofs of the towers are preserved at a height of ca. 6 m above the ground. Narrow windows with arrow slits are extant on Towers 1 and 2. Towers 1-6 and the Keep are all square or rectangular in outline. Tower 7 is trapezoidal in plan. Traces of waterproof cement in the interior of Tower 2 and the Keep provide the only evidence for cisterns on the site. There is a well several hundred meters to the south of the site and another ca. 600 m to the east, but it is not certain if these sources were available in late medieval times. Portions of an old cobble-stone road skirt the north edge of the saddle south of the site and may have served as an important route to the upland valley ca. 500 m south of the site and to the area around the village of Stefania beyond. This cannot have been the major route into the Argolid in any period, but it can perhaps have supplemented the known passes: Agion Ori, Agios Sostis, and Dervenaki. It seems clear that the Frankish occupants of Agios Vasilios were concerned to control access to various strategic roads.

The AutoCAD and Autoshade graphics package provide plans and reconstructed views of the buildings at Agios Vasilios, and have allowed us to process and enhance photographic images to create static and dynamic 3-dimensional simulations of existing and proposed buildings and site environment. AutoCAD also provided precise site dimensions: max. length (n-s) 226 m; max. width (e-w) 129 m; perimeter distance 906 m; and area 20,902 m².

In the second stage of analysis, Geographic Information Systems (GIS) software has enabled us to identify key attributes (e.g., aspect, proximity to water, soil types, elevation, view from site, etc.) for a range of sites within the region from which we have developed both a characteristic profile and a predictive model of site location. The GIS analysis has quantified key site criteria (Dann 1992). A GIS database is a complex site data matrix; elevation, aspect, soils, local hydrology, and vegetation cover are features that make up the database (see Table 6.2). Based on documentary evidence of Late Medieval sites (see Bon 1969; Topping 1949), we identified the Frankish sites in the Korinthia, then used different data sets to isolate the location of the settlements, only some of which are extant. It was necessary to use a GIS that can store and retrieve quickly all of these data, which form the characteristic signature for sites of the period. ERDAS and ArcInfo were used to construct the data base and manipulate the information to produce a model of Late Medieval settlement distribution. The model we derived both analyzes data from sites with known provenience and acts as a predictive hypothesis. Once the characteristic Late Medieval signature was derived, we searched the Korinthia for such locations using the GIS. In the near future, we will expand the model to cover other periods, and we hope to conduct

Table 6.2. Land Evaluation Data for Frankish Sites in the Korinthia. Data from Dann (1992).

	Total Area in the Korinthia		Area Near Frankish Sites			
	ha	%	Upland Sites		Coastal Sites	
			ha	%	ha	%
SLOPE						
0-6%	6,203.937	9.6			2.812	50.0
6.1-12%	19,284.437	30.0	3.31	9.7	2.812	50.0
12.1-18%	14,678.374	22.8	7.874	23.1		
18.1-25%	9,683.749	15.0	6.434	18.9		
25.1-55%	14,531.997	22.6	16.443	48.3		
TOTAL:	64,382.494	100.0	34.061	100.0	5.624	100.0
SURFACE GEOLOGY						
limestone/dolomite	23,005.00	35.7	32.03	94.0	0.124	2.2
marls	19,124.69	29.7				
recent deposits	9,204.621	14.3				
marine sands, gravels, conglomerates	4,558.75	7.1				
talus and depositional cones	3,560.81	5.5				
alluvial deposits (loam and sandy loam)	2,583.44	4.0				
recent deposits in river beds and torrents	1,158.56	1.8			5.50	97.8
alluvial/fluvial/lacustrine deposits	513.06	0.8				
flysch: sandstone, sandy marls	321.62	0.5				
schist, cherts	236.00	0.4	2.06	6.0		
canal dump	115.94	0.2				
TOTAL:	64,382.49	100.0	34.09	100.0	5.62	100.0

Table 6.2 (cont.)

SOIL TEXTURE							
Gravel, poorly-well graded(rocky)		2,478.69	3.8				
Gravel/Sand, poorly graded		154.81	0.2				
Gravel/Sand/Silt mix,deep, well-drained		10,236.81	15.9				
Gravel/Sand/Silt mix, thin-medium, rocky		35,850.06	55.7	32.56	95.6	0.12	2.2
Gravel/Silt, rocky		9.31	0.01				
Sand, poorly graded	1,213.87	1.9			5.50	97.8	
Sand/Silt mix, thick	2,629.37	4.1					
Sand/Silt mix, thin-medium		7,552.50	11.7	1.50	4.4		
Silt/Clay, deep		84.44	0.1				
Sandy clay loam		4,172.62	6.5				
TOTAL:		64,382.49	100.0	34.06	100.0	5.62	100.0
LAND USE POTENTIAL							
Prime Agricultural		1,057.62	1.6				
Good Agricultural		18,765.38	29.1	4.27	12.60	1.06	18.9
Prime Rangeland		4.62	0.01				
Good Rangeland		16,672.13	25.9	15.18	44.80		
Average Land		27,882.75	43.3	14.43	42.60	4.56	81.1
TOTAL:		64,382.50	100.0	33.89	100.0	5.62	100.0

selective field checks. The long-term goal is to construct a multi-layered model of settlement distribution in the Korinthia. By beginning with Agios Vasilios, a Frankish period site, we will be able to proceed from the known to the unknown, i.e., we can study and evaluate the elements of a known Late Medieval site, then extrapolate from the analysis the location of other sites in the same period. The GIS analysis will also benefit the geo-archaeologists and cultural anthropologists studying production strategies as part of the KRRC because of the system's ability to correlate key environmental features of interest (soils, hydrology, etc.) to these researchers. In addition, GIS work complements the site-specific data concerning Medieval sites garnered by intensive survey and geophysical methods (Gregory and Kardulias 1990; Papamarinopoulos et al. 1985).

Certain typical Frankish site characteristics emerged from the GIS analysis. The sites tend to have a north-facing aspect. The range for slope of the four known settlements is 14-26%. No common spatial characteristics could be identified for the geological data because the settlements are located in categories in geological zones that make up 65.02% of the study area. In terms of soils, the sites all appear in areas with thin gravel/silts or sandy silts. The thin soils reflect the location near or on the summit of mountains. Furthermore, thin soils provide only a shallow cover over potential building materials, such as the limestone bedrock common in the area. Elevation of the sites ranges from 180 m to 320 m; in addition, each settlement has a dominant view shed oriented toward a fertile plain below the fortified area and a broad zone around the site. This feature probably played dual roles. The lords of the castle probably wished passers-by to have a clear view of the castle (just as they did of the plain below them) as warning that any movements could be easily monitored from the heights. All the sites are situated on land of moderate quality as pasture or range. An important measure is proximity to transportation corridors; the sites vary in this respect (Akrokorinthos is 1475 m and Agios Vasilios only 75 m from a major corridor) but all are within a distance easy to traverse on foot in about 45 minutes. The sites are separated by distances varying from 9 km to 13 km. Finally, analysis of LANDSAT data revealed a lack of a common reflectance value for the known Frankish settlements. Using these data, we have identified nine additional potential locations of Frankish occupation in the Korinthia (Figure 6.1). In future seasons, we will investigate these areas and refine the settlement model based on the results of the research.

Conclusion

The use of computer aided design and GIS assist site-specific and regional analysis. What we have gained is an understanding of the internal complexity of late Medieval settlements; as the analysis proceeds, we will be able to visualize quite clearly the architectural dynamics of site structure and relate that to the

shifting social tides in a tumultuous historical period, a time of culture contact which involved an intricate dialectic between native Byzantine Greeks and intrusive Frankish lords. The latter clearly selected settlement location on the basis of prioritized landscape attributes. The need for a defensible position placed a high value on intermediate elevation, northern aspect, and a substantial viewshed. Proximity to transportation corridors and good farmland were also key criteria because the Franks extracted substantial tribute or taxes, in the form of agricultural products, from the local residents. While many of the findings are in a sense not revolutionary, we now have a quantitative evaluation. Furthermore, we now have a mechanism for systematically predicting site location. As a result, the late Medieval era in Greece is now beginning to take on a clearer form.

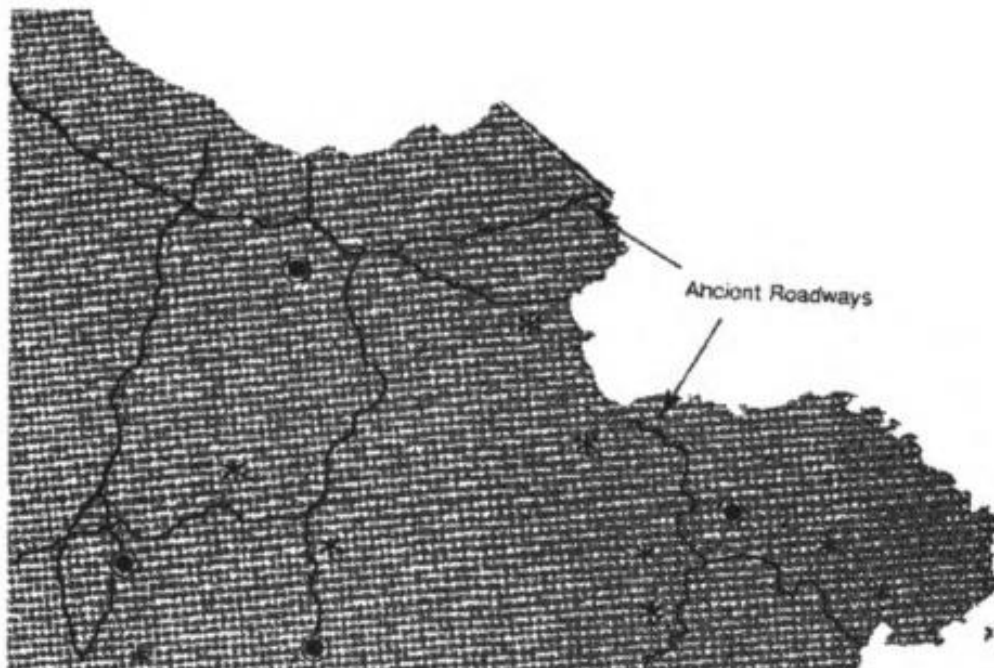


Figure 6.1. Results of GIS analysis showing known (circle) and predicted (asterisk) locations of Frankish sites.

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Greek Sheep, Albanian Shepherds: Hidden Economies in the European Community

Claudia Chang

Introduction

In Grevena the recent practice of hiring illegal Albanian labor for shepherding has an historical precedent at least as far back as the nineteenth century when Koutsovlach herders hired Albanian Vlachs to tend their flocks (Dimen-Schein 1970). The goal of this chapter is to explore how three sets of interlocking factors in shepherding have influenced the changing rural countryside of Greece today: labor management in the form of hiring illegal workers, access to pasture lands in both the Pindos Mountains and the Thessalian Plains, and class relations between herders and their hired help.

In the early 1990s we often saw young, hungry Albanian men and boys traveling across the rugged, rocky landscape of Northern Greece: they traveled with the clothes on their backs and sometimes with bags of their meager belongings on their way to find jobs in the agricultural areas of Northern Greece. Before the Albanian refugees came in the 1990s, the gypsies and other poor people traveled to the towns of Kalambaka and Trikala to find work for the summer months. Seasonal labor was hired from the ranks of the poorest sectors of the rural economy: landless laborers, those with minimal holdings, and itinerant populations such as gypsies, refugees, and others. In this essay I describe a new source of migrant labor prevalent in Northern Greece since 1990, illegal Albanian immigrants. Some of these illegal aliens stop along the way, finding employment as construction workers, farm workers, or shepherds in the mountain villages of Grevena. As more and more of our local shepherd friends began to hire Albanian shepherds in 1992 and 1993, we saw changes in our friends' lives and attitudes; we also became increasingly aware of the hidden economy of pastoral enterprises, in the past and now. Although the hidden or "under" economy had always been there for us to witness, the hiring of illegal aliens added a new dimension to the shepherd lives and gave us broader perspectives

on the ways in which agricultural and pastoral practices were continually changing in Northern Greece.

I began to ask more detailed ethnographic questions about these illegally hired Albanian shepherds. The Albanian shepherds who contributed substantial labor by tending a shepherd's flock obviously contributed to the already changing social landscape of a local and regional economy drastically influenced by the penetration of the European Community. Yet historical and ethnographic documentation for the Koutsovlach shepherds of this region shows that the practice of hiring shepherd labor by richer, land-owning shepherds was pervasive in the late 19th and throughout the first-half of the 20th centuries (Wace and Thompson 1914; Sivignon 1968; Dimen-Schein 1970).

There was a distinct class division between richer shepherds who owned the flocks of sheep and goats and the hired laborers who were contracted to herd these flocks (Dimen-Schein 1970). What influence, if any, did the practice of hiring illegal Albanian shepherds have on the overall land use strategies among the agro-pastoralists and transhumant pastoralists in Grevena? The practice of hiring illegal laborers allows shepherd households to continue to fill in "empty" niches, where agricultural activity in the uplands has diminished since the diaspora and depopulation of Grevena after the Greek Civil War of 1943-1949. The use of term niche as an economic place which can be occupied by herders is similar to the definition employed by Barth (1956) in his discussion of ethnic groups in Swat, North Pakistan. In Barth's example, the Kohistanis occupied two economic niches, their winter place was near terraced and irrigated agricultural fields and their summer place was at high elevation pasturelands that would support their sheep, goats, cattle, and water buffalo.

As a result of depopulation and subsequent abandonment of former agricultural activities in the upland villages of the eastern Pindos (villages found at ca. 800 m. and above), pastoral activities have taken over in areas previously used for the cultivation of orchards and cereal crops while at lower elevations in Grevena there has been an expansion of agricultural practices (Koster 1987; Chang and Tourtellotte 1993). The hiring of illegal laborers does not directly influence a well-established post-war strategy of land use; it only insures its perpetuation by reducing the demands on household labor for daily pastoral activities.

The Impact of Illegal Albanian Immigrants on the Greek Economy

Since the opening in 1990 of the border between Albania, the poorest European nation, and Greece, one of the weakest members of the European Community, thousands of unskilled, illegal Albanian immigrants have entered Greece seeking

employment. Boys and men between the ages of 14 and 45 make the clandestine trip over the mountains from southern Albania into northern Greece on their way to seek agricultural employment in Thessaly or to travel further south to cities and towns. There has been a steady flow of illegal immigrants passing through the Grevena Prefecture, usually on their way to the large agricultural towns of Kalambaka and Trikala in Thessaly. Very few manage to find day labor in the villages of Grevena or with local herders. In 1993 the hiring of illegal Albanian immigrants in Grevena was brought under direct local and regional surveillance as a result of the Greek government's anger over the expulsion of a Greek Orthodox priest from southern Albania; there were massive deportations of Albanian immigrants from major Greek cities and towns during the last week of June 1993. On July 7, 1993, the *Athens News* estimated that there were approximately 250,000 illegal immigrants in a nation of about 10 million people. The *New York Times* of August 5, 1993 reported that about 350,000 to 400,000 (10.9 percent to 12.5 percent of the total Albanian population) were illegal immigrants in Greece, while only 40,000 to 50,000 illegal Albanian immigrants were in Italy (*New York Times*, Section A-6: August 5, 1993). The leader of the Socialist Party (PASOK), Andreas Papandreou, was quoted as saying, "Greece is the only European country which contributes to ameliorating Albania's enormous economic problems by employing thousands of Albanian citizens" (*Athens News*, July 8, 1993). During the summer of 1993, our rough census of the herders from four upland villages on the eastern flanks of the Pindos Mountains indicated that a half to two-thirds of year-round village pastoralists and transhumant pastoralists hire illegal Albanian workers.

This essay investigates the nature of informal herding contracts made between Greek herders and their hired Albanian shepherds. The large-scale immigration of Albanians into Greece is the source of great anxiety at both national and local levels and is seen as contributing to increased crime rates (thievery, homicides, rape) and to the already swollen ranks of the unemployed. How do herders and local mountain communities protect this illegal labor pool from Greek national policies? What implications does the hiring of these individuals have for the strategies of mobility and territoriality employed by herders on the rural landscape? In particular, the two essential components to any pastoral system—access to pasture lands and the necessity to move a flock from place to place over a landscape—may be indirectly affected by the changing labor structure of the pastoral household. Because there is always a direct articulation between pastoral and agricultural land use in rural Greece, whereby sheep and goats graze off stubble, fallow, and fodder while manuring fields and providing valuable pastoral products of milk, cheese, and meat to rural populations, it stands to reason that added labor in a pastoral household may result in new opportunities for herders to expand their own agricultural holdings or to participate directly in farming activities (Koster 1977). Furthermore, from a socio-political perspective, the widespread practice of hiring illegal Albanian

immigrants as herders also suggests the degree to which members of the pastoral sector engage in "hidden activities" at the periphery of the state and market.

Greek Pastoralism as a Non-Rationalized Economic Strategy Within a Capitalist Market Economy

My goal is to demonstrate the interrelations between the ecology and economy of Greek pastoralism within the larger socio-political structure of the European Community. Illegal hiring of Albanian workers by Grevena herders provides a specific ethnographic case study of the ways in which the under-economy flourishes at the margins and peripheries of a national and international market system. I rely primarily upon the use of both cultural ecological and economic models to demonstrate how and why Greek pastoralism must function underneath the structure of a formal economic system. First, pastoralism as a land use strategy relies upon access to grazing land (grazing land may consist of uncultivated land or cultivated land that lies fallow, is planted in fodder crops, or has been harvested recently). In the case of Greek pastoralism, an individual's access to grazing lands is most often negotiated through channels of kinship and patronage, and thus rarely conforms to the basic capitalist principles of buying, selling, or renting land. Second, in many rural areas of Greece, pasture areas are designated as village common lands. Herders gain access to the use of commons by paying head tax on the number of animals they own. The negotiation of territory within the village commons is subject to a set of informal rules by which herders monitor and attempt to curb over-grazing of the commons (Koster 1977; Koster and Forbes 1978; cf. *The Ecologist* 1992). Finally, since labor within the pastoral sector is usually drawn from the pool of available household members, it is defined in terms of moral and familial obligations, not as wage labor. Illegal hired labor changes the fabric of household labor organization. When a herder can leave the job of herding animals to hired help, he is able to spend more time on other economic activities. One shepherd, whom I will discuss in greater detail, was able to spend more time working on his vineyards in the lowlands during the summer months while the hired shepherd kept his flock in the uplands. His wife, who previously may have had to help with the daily milking, has free time to socialize. The removal of key family personnel from the routinized activities of animal herding is also a sign of prestige and class mobility. Thus, the strategic management of labor is a critical element of land use. The families who hire the Albanians may have to provide them with adequate food, clothing, and housing. Although the Albanians are seen as "outsiders" they are often brought into families who must protect and shield them from the moral envy of other households who may also covet such a source of labor. And as has been noted in Greek ethnography time and time again the moral responsibility of the individual

to the family is of extreme importance for maintaining the ideological code of social honor (Campbell 1964; Herzfeld 1985). Thus, it is preferable for families hiring Albanian workers to treat the laborer as a member of the family so as to minimize his potential ability to act as a "free agent" who could destroy social honor or family autonomy. And since the laborers are for the most part male, they must respect the fact that sexual access to the women of the family is forbidden, and that they must not advertise household secrets to the community.

Since 1982 the European Community has provided Greek herders with increased benefits in the form of social insurance, subsidies, price supports for the marketing of produce, credit and loans, improved infrastructure, subsidized truck transport of herds between summer and winter pastures, and incentives for improved veterinary care (Koster 1987). For most pastoralists there has been a marked improvement in their standard of living: many own small imported Japanese trucks so that they no longer sleep out at night at their animal folds. All use supplemental feeds for herd animals during the winter months, and they enjoy considerable economic wealth, sometimes surpassing the wealth of the village farmers. Despite the increase of living standards for the average herding household, the basic requirements of providing pasture for their animals, herding and tending the flocks, and milking the animals still shape the daily existence of these herders.

Access to pasture remains a primary concern of the herder. One of the major challenges for the Greek herder is his ability to actively negotiate for rights to land. Even though herders may own or rent parcels of grazing lands, or obtain use rights to common lands, typically the ability to gain sufficient grazing land takes on its own social flavor. When Herzfeld (1985) writes so eloquently about the coffee shop bravado of the "Glendiot shepherds who steal sheep to befriend other herders," he is also alluding to the social clout that shepherds need in order to obtain the necessary pasture resources for their flocks. Campbell (1964: 224-64) discusses how Sarakatsani shepherds negotiate rights to grazing land and other crucial resources by maintaining and cultivating patronage ties to Zagori villagers, cheese merchants, village presidents, and other local officials. The swaggering bravado expressed by the Koutsovlach or Cretan shepherd is not only a necessary display of manhood prevalent in Mediterranean societies, but part of a necessary social personae; such "toughness" may be required to negotiate successfully for access to pasturelands and to prevent other herders from invading his grazing territory.

In Grevena, at elevations of 900 to 1100 m, where a majority of land used for the cultivation of wheat, barley, and orchards before the 1940s has now been abandoned, an empty niche has recently been opened up for herders. In one village in this environmental zone, population size fell from ca. 5,000 to 250 people between the Greek Civil War of 1943-49 and the 1970s, when the village school was closed. The majority of this depopulation took place immediately after the Greek Civil War, but continual depopulation occurred in the '60s and

'70s. The once flourishing agro-pastoral economy collapsed. Now a few year-round village residents, usually older people, continue to farm and keep animals at a much smaller scale than before. Transhumant shepherds use these upland zones in the summer for their animal flocks, but leave during the school months for the lowland plains. The village herders and other local residents can identify who owns abandoned field holdings, although most of these distant and more marginal farmland areas have reverted to grassland and shrub areas. The herders in those villages where many farmers abandoned fields have taken over these areas as pasturage for their flocks. Most of these abandoned fields can be used by herders without permission by the owners and it also appears that the herders are not charged rental fees for the use of such plots. In some areas in Greece any fields abandoned over a five year period may revert back to common lands (Campbell 1964; Dimen-Schein 1970); unfortunately, I do not know what the practice is in Grevena. In any case, the herders who use abandoned fields for grazing lands, whether by permission or not, must defend their claim to this pasturage from other herders. But the herder's ability to gain access to a given territory within the village common lands and the zones of abandoned agricultural fields is contingent upon his "traditional" claim to this area and his strength in asserting his rightful claims over those of potential invaders. Herders must effectively define the boundaries of their grazing territories across the landscape, fiercely guarding their territories against encroachment from other flocks. They lay claim to a territory through the placement of their animal folds or *stanes* (corrals) and then maintain such claims through effective use of social networks, alliances with other herders, and retaliation against potential invaders. Social conflicts and frictions between herders are usually a result of disputed grazing territories. In 1993 one transhumant herder who travels from Thessaly to a Koutsovlach village told us that because he arrived one day later than another shepherd, he was forced to move to a more distant grazing territory. We suspect that this herder had actually managed for two summers to have a prime location along the road because he is the older brother of a very successful herder. During the previous two summers, while he was still recovering from being thrown off a horse, his brother secured him a place by the road, most likely by muscling other herders out of the territory. In the summer of 1993 his brother, who traveled to the mountains a month earlier, was either unable or unwilling to apply the necessary pressure to secure him a grazing territory near the main road.

Herders also rely upon household labor and other forms of labor exchange. Cooperative labor exchange often occurs in activities such as shearing. Household members work for the good of the household, but do not obtain wage remuneration, nor do they "punch a time clock." Some herders choose to make their own cheese rather than sell their raw milk to cheese merchants. In the one case we know of, two herding partners rely upon the labor of their wives to produce cheese daily. This cheese is sold informally through a network of 15 people (friends and relatives) and is also used as a form of rent payment for use

of the refrigeration facility in the town of Grevena. The cheese may also be exchanged as a form of payment for pasture (Koster, personal communication).

Greek Herders and Illegal Albanians: Rationalizing a Class Relationship

My purpose here is to explain how the hired shepherd, though of inferior social status and ethnic group, is taken into the household and brought into relationships with the employer that are "personalized" and therefore become "kin-like." Herders who hire illegal immigrants do not rationalize the relationship in terms of wage earning, but attempt to disguise class differences, while emphasizing the moral obligations that the employer has to the worker. Greek villagers define the relationship between themselves and hired Albanian workers in patronage terms, disguising the obvious fact that they are exploiting surplus labor.

The relationship between employer and hired Albanian herder is strikingly similar to the relationship existing between the *tselingas* and the *tsopanos* in the late nineteenth and early twentieth centuries, as outlined by Dimen-Schein (1970) for the Koutsovlach village of Fourka. In rural Greece, the *tselingato* or herding company was comprised of agnatic kinsmen who herded animals together (Campbell 1964). The *tselingas*, who was the most senior man, was responsible for key economic decisions. Dimen-Schein (1970) examined the process by which the relations between the *tselingas* and *tsopanos* led to two separate classes of shepherds, rich and poor, in Fourka. As a result of this research (Dimen-Schein 1970:76-81) we know the following: in the late nineteenth and twentieth centuries rich transhumant Koutsovlach herders were able to hire poor Koutsovlachs from Thessaly, Macedonia, and Epirus, and some Albanian Vlachs. The availability of this ready source of herding labor most likely was a result of the dissolution of the Ottoman Empire in the Balkans resulting in herders often "caught" between the territory of the independent Greek nation-state and the territory still held by the Ottoman Empire. Wace and Thompson (1914) describe the political instability of this period as the reason why many Koutsovlach herders gave up pastoralism altogether.

The resident Koutsovlach shepherds from Fourka hired by rich herders also owned animals. Since the hired shepherds had no political rights in the summer village, they relied upon their employers for pasture lands. The employer also provided the shepherds with vitally important contacts to wool and milk merchants. The employer would take the products of the herds, sell them and then pay the hired herder his wages from these proceeds. Since hired herders were often expected to pay double or triple tax for use of summer grazing lands, the hired herder often obtained just enough salary for subsistence and daily expenses. He might be paid enough flour for bread and some gold lira. Thus, the hired

herder was completely dependent upon the employer, never realizing enough profits from his own flock to become an independent shepherd. The more successful hired shepherds were able to become muleteers and therefore did escape the vicious cycle of dependency upon the *tselingas*. The *tselingadhes* themselves would often leave herding altogether and enter into other kinds of employment, allowing the *tsonpanos* to maintain their flocks. This case is similar to Bradburd's (1990) ethnographic discussion of Komachi pastoralists of Iran who also established hierarchical relationships between the herd owners and the hired herders, but disguised the hierarchical nature of the relationship by stressing kinship obligations between rich and poor shepherds.

Among the Komachi pastoralists of Southwestern Iran, rich shepherds hire poor kinsmen to herd their flocks (Bradburd 1990). The Komachi define the exploitative class relationship between *arbabs* (herd owners) and *chupans* (hired herders paid a wage) through the idioms of kinship and non-capitalist forms of obligation. Shepherd contracts took on a quasi-capitalist relationship, although the hiring of shepherds usually occurred as a result of kinship relations. The wives and daughters of the *chupan* provided additional labor, often described as *komak* (assistance and cooperation given freely to kinsmen). In both the Persian and Greek cases, the class relationships between shepherd employers and hired herders were often made ambiguous or were disguised—either in kinship terms or through the use of ethnicity. For the Koutsovlach, shared ethnicity between the hired shepherd and his employer, seen against the background of an emerging Greek nation-state where ethnic minorities were not viewed positively, could have helped to mask the exploitative nature of the class relationship.

During the nineteenth century, in the Kermani areas where the Komachi reside, opium poppies increasingly replaced wheat and barley as the key crops (Bradburd 1994). This decrease in agricultural land/man ratios further pressured shepherds to increase their production of sheep's wool as a commodity that could be sold in the market and its profits used to buy necessary agricultural staples of wheat and barley (Bradburd 1994: 53). In Greece, at the end of the nineteenth century when such class divisions between the herd owner and hired shepherd were common, Grevena herders also faced a difficult political situation. In 1881 the Greek national government held Thessaly, while the Turks continued to control the uplands of the Grevena region (Wace and Thompson 1914: 161). More Koutsovlachs chose to be Hellenized and settle permanently in the lowlands. We can surmise that this might have led to more land shortages in Thessaly for both agricultural and pastoral pursuits. How did these changing relationships of land tenancy in Thessaly affect the herders who continued to move between the Thessalian Plain and the upland Grevena area? While I do not have the necessary historical documentation to support my speculations, it may be the case that the Koutsovlach herders responded to the decreased availability of pasturelands in Thessaly by using hired labor as a means of increasing herding profits. Greater profits could have been used to rent lowland pasturage areas,

when a herder did continue to move between the uplands and the lowlands. At any rate, the entire range of both upland and lowland land/man ratios for pasturage and agricultural activities would have to be determined in both the Turkish domain and the independent Greek state if we wish to explain the emergence of hired shepherd/herd owner class as a consequence of such demographic pressures on the land.

The differences between the historical situation of hired herders and the contemporary situation of hired shepherds must also be outlined. The Albanian hired shepherd is usually an illegal immigrant and therefore he must be protected from policies of the nation-state. During the summers of 1992 and 1993 when we asked herders about hiring illegal Albanian immigrants we were given explanations emphasizing the moral obligations Greek villagers felt towards a group of poor, starving outsiders. While there were general complaints about the fact that Greece had become a repository for illegal Albanian immigrants, we noted that even in 1993 at the height of official deportation of illegal Albanian immigrants, villagers chose to evaluate the situation in moral and personal terms. Some Grevena villagers defended individual Albanian immigrants and decried the actions of the government, especially when an individual villager happened to benefit significantly from the added source of cheap labor. A herder's wife, who was relieved of the daily milking ever since her husband had hired an Albanian worker, was particularly distraught that the Greek government had taken such a hard line on the mandatory deportation of illegal laborers.

When herders and others hire Albanians illegally, they must rely upon the collective good will of others not to turn in the Albanian worker to the authorities. Those who employ illegal immigrants attempt to define the relationship as a form of moral charity, hoping that co-villagers will not see the relationship as enviable and therefore worthy of destroying. Villagers who hire Albanian workers must also make sure that their workers are not competing with the village labor force in any way. In 1991 a village woman lost three Albanian builders during a 7 a.m. police raid by the municipal government. Some villagers were certain that an informer, who was trying to protect the local builders' trade, had informed the police. Even if an inside informer was not the cause of the raid, there was certainly village comment on the fact that she hired these Albanians at low wages, undercutting the local labor market. The Albanian who remained in the village was a 22-year-old man hired by a transhumant shepherd. People speculated that he was spared because he was in the mountains sleeping in the *kaliva* (hut); it is also a well known fact that this Albanian is employed by a shepherd whose sister is married to a local policeman. The policeman owns a third of the flock that this Albanian shepherd herded.

The Under-Economy Inside the Pastoral Sector

In 1993 at one upland farming and herding village, where there are two year-round village herders and eight seasonal transhumant herders (a total of 10 pastoral households), six of the 10 herders had hired illegal Albanian immigrants within the year. During the summer of 1993 wages ranged from 1000 to 2000 drachmes (220 drachmes=\$ 1 U.S.) per day for the hired shepherd. The \$5 per day salary is considered to be substantial given the average Albanian salary per month. Most of the salary was saved for remittances or to purchase high price status items like televisions, radios, etc. that could be smuggled back to Albania and sold on the black market.

Since most Albanian herders in the village knew each other, labor prices had been fixed; this was in contrast to 1992, when wages differed considerably. When I asked a shepherd from another village why he hired an Albanian shepherd for 40,000 drachmes per month, a lower salary than the average salary paid by other herders, he rationalized the wage price in capitalist terms. He said that the Albanian herder they hired only grazes the animals during the day. His father and he continue to milk the animals twice a day. He says that when the hired herder milks the animals he does more work and is considered more valuable. We observed, in this regard, that those herders who hired Albanians with no livestock experience did not allow the hired herders to milk the animals; instead, they relied upon household labor for milking to insure the quality of milk production. Individual herders prefer to monitor the daily production of each lactating animal as a direct indication of daily grazing conditions and the physical well-being of individual livestock (Koster, personal communication). A good herder uses milk production as a gauge of the environmental and ecological conditions of grazing conditions. Herders often comment about the adverse effects of rain, extreme wind or cold on milk production. If personal experience is any indicator, my husband, who grew up with dairy goats and has considerable practice with milking, is rarely allowed to milk animals because this is the one productive activity that herders most wish to control within the context of household labor. We noted the extreme pleasure of a shepherd father exclaiming to us that his fourteen-year-old son was now a *levendis* (a stalwart man), because he could milk the entire flock by himself. Even when hired herders do milk the flock, they usually share this labor with some member of the employer's household who will be responsible for overseeing this important activity. In Crete, the Peloponnesos, and Grevena, Koster (personal communication) has observed herd owners who will make it a point to arrive at the milking time to monitor the milk quality and quantity.

During the summer of 1992 a transhumant shepherd hired a 22-year -old Albanian, Vasilis, to help milk his animals and to herd his flock. This was the same illegal immigrant who evaded the village raid. When Vasilis began working in 1992, he was given a salary of 1000 drachmes per day, plus food. He slept out

at the tin *kaliva* (herder's hut). In October of 1992, he contacted his 18-year-old brother Petros (the youngest of 12 children), who then crossed illegally into Greece and was hired by another transhumant herder from the same village. The shepherd who hired Petros said that after eight months he had spent about 300,000 drachmes in wages. In actuality, he calculated that he had spent far more on Petros' upkeep—in his estimation about 3000 drachmes per day, if he counted the money spent for the boy's food, the fact that he provided him with clothes and shoes when he first arrived, and that all winter he had lived in their home, and not out at the *kaliva* because Petros feared he would be robbed by other Albanians if he stayed at the hut. During this time Petros lived with the family in the winter village in the Thessaly Plains. When I asked him why he did not subtract such costs from Petros' wages, he said that he could not, since the boy did not have anything to begin with and he had a moral responsibility to provide for the boy. Although the herder had been able to spend more time cultivating his vineyards in Thessaly during the time he employed Petros, he chose to cast the relationship between his hired herder and himself as one of dependency and having both a personal and moral dimension. Like the relationship between *tselingas* and *tsopanos*, the exploitative nature of the relationship between employer and hired shepherd is disguised or made ambiguous through patronage practices and attempts to redefine the relationship as personal and moral. The class relationship is clearly exploitative and provides this shepherd and his household with additional labor. This shepherd has been able to escape the full time occupation of herding while diversifying and expanding his agricultural holdings in the Thessalian Plain.

Most hired shepherd labor in Grevena were Albanians who came during the summer months. There are several reasons why the herders preferred to hire Albanians in the summer. First of all, there was a larger pool of available labor coming from the Albanian border to the Thessalian Plain. Second, the mountains were a refuge where the Koutsovlach herders were able to engage in clandestine activities without the same amount of scrutiny leveled in their winter villages.

Pastoralism and Illegal Labor at the Fringes of the European Community

A recurrent theme in Mediterranean ethnography is tension between the large bureaucratic nation-state and the autonomy of local rural communities (Pitt-Rivers 1971; Campbell 1964; Herzfeld 1985, 1986, 1987). In Greece there are two recent trends that exacerbate the tensions between state and local community. First, the rural commodity producer is tied to a fixed land base within the fully subsidized agricultural economy in which the agrarian class has begun to achieve a standard of living on a par with that of the industrial wage earner. The fixed land base is subject to the local practices of partible inheritance and dowry

allotments, and in the case of pastoralism, may be designated as village common lands. For pastoralists, the access to the fixed land base necessitates the continuation of patronage ties obtained through actual and spiritual kinship, use of cultural and social forms of negotiation, and actual ownership of land. Second, herding households must rely upon patronage ties and kinship for access to pasture and for the labor needed to carry out the daily activities of herding, milking, feeding, and watering animals, and transporting milk to local merchants. Herders who hire illegal immigrants are part of the hidden pastoral economy that is far removed from formal market structures and the state. When there is a large influx of illegal immigrants, local villagers are quick to augment their economic base by hiring Albanians. The Grevena herders follow a practice similar to that of the *tselingas-tsopanos* relationship. The employer becomes a patron by making all the necessary arrangements for obtaining pasture lands and negotiating with cheese merchants and butchers. Unlike the *tselingas* of former times, however, the herd owner continues to participate daily in husbandry activities, especially the most valued productive activity—milking. The hired Albanian depends upon the employer for protection from the state and from other Albanians. If the hired Albanian decides to apply for formal work permits and visas, he will depend upon his employer to make the appropriate contacts. Most contracts are short-term, a condition both parties prefer. Albanian immigrants like to have the freedom to travel home with their earnings. They use the ties established with employers to return to the same villages on a seasonal basis and often to work for the same herding family. During periodic raids of the upland villages, Albanian herders are less likely to be taken away, although it is often well known which herders have hired illegal Albanian workers. Therefore, one can only surmise that there is general collusion between the village and the herders to protect these Albanians from the authorities. Since there are large tracts of upland areas no longer farmed, herders have full rein over abandoned fields as well as commonlands. Herders who fill this niche, still have to do so within the constraints of a family-based labor force. The hiring of illegal Albanians allows the herder to keep sheep on the land while relieving his wife and other family members of duties such as milking, herding the flock, and transporting milk; when such a readily available source of labor did not exist family members performed all these tasks. As abandoned fields provide additional pasture, the herder is eager to use such areas with his large flocks.

In essence, hired cheap labor provides a herder with a good solution to all his problems. He can continue to lay claim to abandoned agricultural fields and commonlands for pasture through his bravado, social networks, and patronage relationships. His hired shepherd, rather than the herd-owner himself, has to do all the major tasks of shepherding. The profits made from the products of shepherding can be used to purchase a wide range of goods which make a herder's life more "modern" and convenient. His wife and children spend less time with the flocks, thus reducing the stigma of coming from the class of people

who works with animals. According to Wace and Thompson (1914), the Koutsovlach shepherds experienced a scarcity of land during the latter part of the nineteenth century. If they decided to use hired herding labor it was to diversify their household economies in both the agricultural and pastoral sectors. The added labor force of hired Albanian shepherds allows the Grevena herder to participate effectively in agricultural activities in the lowlands during the summer while maintaining his herds in the uplands. Increased labor allowed Grevena herders to fill an empty niche in the uplands, but the more important limiting factor is however that animals placed in upland areas must have adequate access to pasture resources in the areas of Thessaly where herds spend the winter. Historically, this area already represents an area of extreme competition in which ethnic groups of herders are often on the bottom of the social class system and must compete for scarce winter grazing lands.

We must then return to the suggestion made by Dimen-Schein (1970) and Sivignon (1968) that hired labor allows the shepherd to rise in both social status and class position. The transhumant shepherd woman who no longer has to milk her flock twice a day, but can entertain foreign visitors and other guests during the leisurely afternoons in her husband's summer (home) village, has risen in social standing in the eyes of the community. Her husband, who has become a *tselingas*, is now an employer and has moved up the class ladder. In a society where class is valued as a means of gaining prestige and also eventual economic clout, the cash outlays paid for a hired shepherd are worth the risks of village and official scrutiny, if there are tangible benefits in improving family status and class position.

I made the point above that villagers are in collusion with their transhumant herding kinsmen: they are willing to protect the Albanian shepherds from official eyes. Many villagers comment that the Albanian herders are always up in the mountains with the sheep and therefore are neither easily visible to officials, nor do they enter into everyday village life. Most herders continue to remain outside the everyday constraints and confines of village life. It is easy for local village presidents and other local officials to cast a "blind eye" toward illegal activities in the mountains. We have no direct evidence from informants or others, but it is probable that herders pay off these officials through small favors — giving them meat, cheese, and other pastoral products.

Conclusions

The hidden aspects of Grevena pastoralism may best be explained in these ways: (1) herders, defined as commodity producers within an internationally subsidized agricultural program, use economic resources to perpetuate non-capitalist forms of patronage; (2) the patronage relations cannot be destroyed by the European Community because herders need access to grazing lands often gained through

the use of social networks or by establishing one's use claims to grazing territories within the village common lands; (3) some herders choose to escape the price structure of the market and the exploitative relationship of cheese merchants, who buy raw milk at low prices and sell the finished product of cheese at high prices, by making their own cheese and "marketing" it informally through friends and relatives; and (4) many herders hire illegal Albanian workers whom they hide and protect from authorities by defining the relationship locally on the basis of moral and personal obligation, while currying protectionism from local officials and others.

Let me particularly emphasize the second point: why the patronage system among herders cannot and will not be destroyed by the capitalist penetration of the European Community. The engine in this particular pastoral machine is the access to pasture lands in two places, the Grevena uplands and the Thessalian Plain. The individual herders who practice transhumance and move with their flocks between these two places must be able to obtain pasture lands in both environmental zones through ownership, rental, or use-rights. The individual herder relies on kinship and patronage ties to maintain his rights to pasture, through whatever formal or informal contractual means he obtains these grazing areas. While he can use cash resources to obtain land, it is better for him to create obligatory personal ties since he will be able to manipulate such ties outside a market-driven system. For example if a herder were to give a product such as cheese to a landowner in exchange for pasture, he could undercut the price value of the cheese on the market and bypass the market altogether; at the same time he can dispense with a surplus product that an agricultural land-owner may need. The European Community will never regulate such activities because its aims lie in creating and maintaining local, regional, and international markets, not in fostering personalized patronage relations outside the market. Yet for the local player, his astuteness at being able to benefit from the state subsidies of the European Community while using his own personal patronage relations to function outside the formal market allows him to live in the best of all possible worlds.

The hiring of illegal Albanians in the pastoral sector has interesting economic and ecological ramifications for Grevena land use strategies. The job descriptions of the illegal herders within the household economy underscores a key ecological and economic component of the system—milk production. If a hired Albanian milks the animals, he is considered as skilled as the herd owner and, thus, is paid a higher wage than the Albanian worker who only herds the flock. In all the cases we observed a hired Albanian herder was never allowed to milk the flock without one member of the household present. Therefore, this must be seen as the most crucial element of the production system for reasons already mentioned above. When various members of the pastoral household are freed from herding activities, the household may attempt to diversify its economic base into agricultural activities. Such is the case of the one shepherd who used his

spare time away from herding in the uplands to return to his vineyards in the lowlands. In the case of transhumant herders who travel from the winter pastures in the Thessalian Plain to the summer pastures in the uplands of the Pindos Mountains, diversification and expansion of agricultural activities will most likely occur in the lowland winter areas where land is more fertile and crops more easily cultivated.

Access to pasture lands in the lowland areas of Thessaly is in many ways the crucial determining factor in a herder's decision to commit himself to a given herd size. While pasturelands in the summer mountain areas are obtained primarily through the commonlands or use-rights, a greater proportion of the grazing lands in the winter areas must be owned or rented by herdsmen (Koster, personal communication). Therefore, a complete picture of land-use practices really must depend on a fuller understanding of the man/land ratios in the winter pasture areas. Most of our discussions have been about access to pasture in the upland regions of summer or year-round pastoralism. The use of illegal labor continues to allow herders to expand into the abandoned agricultural areas in the upland areas of Grevena. As I mentioned above, the vast area of abandoned fields and terraces of the mountain villages of Grevena are a direct result of the depopulation and diaspora of the Grevena population after the Greek Civil War of 1943-49. Since the 1950s, this empty niche has been filled quite successfully by village and transhumant herders, resulting in the contemporary dominance of the Grevena pastoral economy over agriculture in six upland Grevena villages (Chang and Tourtellotte 1993; Chang 1993). Our focus on the illegal hiring of Albanians by Greek herders is an attempt to outline one aspect of the pastoral economy. Furthermore, the historical precedent for such hidden economies in Greece is considerable, since mountain refuges are the most likely loci for anti-statism, rebellion, banditry, and petty crime, activities that often were initiated by herdsmen.

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YOURS, MINE, AND OURS: PRIVATE AND PUBLIC PASTURE IN GREECE

Harold A. Koster

Introduction: The Problem of Pasture Access

So where do you graze your flock? This prosaic pastoral question may appear uncomplicated, but it invariably leads Greek shepherds into animated and extended discussion. Pastoralists must always control sufficient livestock, pasture, water and labor if they are to survive as herders. It should be stressed that there is no simple priority to these factors of production. Any one of these or some combination may be more critical, scarce or susceptible to control or alienation by others. For example, among the Komachi in Iran, Bradburd points out that gaining access to animals is much more difficult than is securing pasture, and can be a basis for social differentiation (Bradburd:1992, 1994). Among the Ulla Ulla Aymara herders of Bolivia, Caro argues that even when pasture was appropriated from *ayllu* members by local and regional elites, these herders successfully resisted by withholding labor and making the use of the appropriated pastures unprofitable (Caro 1994).

When livestock products are sold rather than consumed directly by the household, herders must also find market outlets. Every Greek herder must locate adequate pasture if he is to meet his flock's nutritional needs, and securing a *livadi*, or complement of pasture, is a necessary and dominant concern of all shepherds, wealthy or poor, transhumant or local. Although today they are likely to rely on a variety of concentrated supplements and other feeds for their animals to an extent which was rarely possible in earlier years, native pasture continues to support their flocks just as *psomi* (bread) sustains their families.

What is the nature of this "pasture"? It has long been recognized that pastoralism in the Mediterranean lands is intimately linked to agriculture (Boag 1995; Braudel 1972; Chang 1981; Cherry 1988; Jameson et al. 1994; Koster and Koster 1976; Koster 1977), and of course the agricultural fallow as well as agricultural residues such as olive prunings and grain stubble provide critical

components of any Greek flock's forage (Halstead 1987, 1990). However, the extent of the Greek arable today is less than one third (29.9 percent) of the nation's surface area (NSSG: 1986:35) and, as important as its resources are to the success of any Greek herder, it is rarely the sole resource for even the most "improved" and intensified flocks. I have dealt at length elsewhere with the importance of the integration of pastoral and agricultural components in the Greek rural economy (Koster 1977). It is difficult to overemphasize the importance of this linkage. For the purposes of this chapter, however, I shall place greater emphasis on the pastoral utilization of the "non-arable" (which is itself a slippery enough category).

The second leg of the Greek grazing regime has always been found on the *voskopoi*, or pastures of the *vouna*, or rugged mountain "waste." Forty percent of the total land surface is so classified, with another twenty percent designated as forest (NSSG 1986:35). Much of the forest land is also subject to both legal and illegal grazing. In the later phases of Ottoman rule and in the early years of the modern Greek state, when less of the better land was cultivated, the potential pasture acreage was even greater. As more of this land (particularly that of monasteries and larger estates, or *chiflikia*) was appropriated and redistributed by the Greek state and came under the plow, the numbers of transhumant sheep/goats which relied on this pasture declined (McGrew 1985:14; Psychoyios and Papapetrou 1984; Psychoyios 1985; Servakis and Pertountzi 1933: 164; Sirakis 1925). With, however, more than half of the land surface of contemporary Greece available as pasture it is not surprising that pastoralism continues to play an important role in the rural economy. This chapter will focus on these extensive pasture and forest resources which are the result of millennia of co-evolution with human and animal populations (Boag 1995; Forbes and Koster 1976; Moreno and Raggio 1990; Nyerges 1982; Rackham 1983). It is also important that these "pastures" have, of course, a multitude of other uses in addition to providing forage for the flocks (see chapters by Allen, Clark, and Forbes in this volume as well as Clark 1976a, 1976b, 1976c, 1977, 1988; Forbes 1982; and Koster and Forbes 1978). How do herders gain and maintain access to these pasture resources? What have been the ecological, social, and economic consequences of these systems of access?

Public Pasture in Greece Today

In modern Greece, non-arable pastures are mostly held within the public *demesne*. Much uncultivated mountainous and hillside land is held in common by *dimoi* (municipalities), and *koinotites* (local village communes). Of the total of 52,550,200 *stremmata* (one *stremma*=1,000 m², or 0.10 hectare) classified as pasture in Greece, 30,003,800 *stremmata* or 57 percent are held by these local administrative and political units (see Table 8.1; percentage computed by

following formula: column 3 / [column 3 + column 4]). Village common pastures are actually even more extensive than would appear from a consideration of national statistics.

Table 8.1. Distribution of Area by Land Use in Greece in Thousands of *Stremmata* (one *stremma* = 1,000 m² or 0.10 hectares). Figures have been rounded to the nearest thousand.

Region	Total Area	Arable ¹	Municipal, communal pasture	Private & other pasture ²	Forests	Other ³
	1	2	3	4	5	6
Greece - Total	131,957	39,452	30,004	22,546	29,511	10,444
Capital District	427	18	1	12	71	325
Sterea & Euboea	24,391	6,284	5,868	4,139	6,229	1,871
Peloponnesos	21,379	7,173	4,231	4,274	4,402	1,299
Ionian Islands	2,307	780	148	974	218	187
Epiros	9,203	1,298	3,397	1,294	2,414	800
Thessaly	14,037	5,076	3,240	2,042	2,720	958
Macedonia	34,177	10,735	9,039	2,533	9,037	2,833
Thraki	8,578	2,955	1,732	551	2,766	574
Islands	9,122	2,043	1,415	3,234	1,276	1,154
Crete	8,336	3,090	933	3,494	378	441

Source: National Statistical Service of Greece (1986: 42).

1. Includes land fallowed less than six years.

2. Includes private, jointly-owned, State, monastic and individually-owned pastures.

3. Includes lakes, marshes, roads, built-up areas, rocky waste, mines and other areas.

These data mask the fact that pasture located in local administrative units is retained by the state but used and administered by members of the locality. Land categories in Column 4 (Private & other pasture) in Table 8.1 include private, jointly-owned, monastic, and individually-owned pastures, as well as state-owned grazing lands. For example, in the *koinotis* of Didyma in the southern Argolid, 100,200 *stremmata* listed by the NSSG (1986:101) in this category remain within the state demesne, although these lands are administered by the village council. The commune shares the tax receipts from the use of these pastures with the national state. Residents of the community consider these lands as *koinotiko*, or village common and treat them as such. In recent

years, however, the state has exercised its authority to lease extensive marble quarrying rights to entrepreneurs within the *koinotiko*. When quarrying comes into conflict with herding (even where established folds are in the proximity of dangerous blasting), the herders' informal rights of usufruct are superseded. Such actions are enforced by both local and state officials.

A brief perusal of Table 8.1 reveals dramatic differences in the percentage of public pasture held by local communities (see formula above). The regions with the highest percentage of total pasture held by the localities are Macedonia (78%) and Thraki (76%), Epiros (72%), Thessaly (61%), Sterea and Euboea (59%) and the Peloponnesos (50%). The regions with the lowest percentages of public pasture held by the *dimoi* and *koinotites* are the Capital District (8%), the Ionian islands (13%), Crete (21%), and the Aegean islands (30%). The caveat must again be offered that these figures for public pasture are low. If the state-owned forest pastures are included, the percentage of total grazing which is public rises to 72% ($[\text{columns } 3 + 5] / [\text{columns } 3 + 4 + 5]$). If those communities whose mountainous pastures are retained by the state are also included, the total would surely rise even more dramatically.

Although these public lands are legally and corporately held by the *koinotites* for their residents, we must recognize that the formal dichotomy we have drawn between public and private tenure serves a heuristic purpose, and on the ground such a division remains an oversimplification for herders who must negotiate a complex mix of competing interests in these resources and their use and control. Not only are these lands subject to the systems of formal and legal control and tenure established by the national state, but also to those of customary law and local practice. As McGrew (1985: xii) notes in his exhaustive study of the transformation of Greek land tenure from the period of Ottoman rule through Independence, there is an "ambiguity surrounding property ownership in contemporary Greece...In most districts one finds that there is no cadastral register, that many landholders have no title deed to their farms, and that boundaries are not clearly fixed. Lines between private holdings and community or state property are frequently vague."

In the *koinotis* all residents with political rights have *de jure* access to village common pasture under terms established by the local council. The council may, however, set and enforce stocking rates to avoid overgrazing. Village officials often retain great powers over the actual use of the community's pastoral resources (Campbell 1964: 225-229). Capitation taxes are collected from herders by the *koinotis* for pasture use, with double rates charged for numbers above 150 and for the flocks of non-residents permitted to graze by the *koinotis* council. These tax rates are fixed within limits set by state authorities. Grazing taxes are paid in cash, although before the Second World War they were more often paid in kind as in the *koinotis* of Kritsa in eastern Crete, where before 1930 these taxes were paid in cheese, or not at all as in some villages in Roumeli (Loukopoulos 1930). The rates are set relatively low

to assure open access to most community residents. In Didyma in 1971 the price was 6 *drachmes* per head below 150 animals, and 12 *drachmes*, or double per head above 150. By 1975 the rate had risen to 8 and 16 *drachmes*. In this period the exchange rate was 30 *drachmes* = 1 U.S. dollar. Thus, the total grazing fee for a flock of 100 head in 1971 was \$20 U.S., and in 1975 had increased to almost \$27 U.S. By 1990 the cost was 16 *drachmes* with an exchange rate of 150 *drachmes*=1 U.S. dollar. The cost had dropped to the equivalent of less than \$11. This represented a small fraction of the total cost of pasture. The community assured access for all by allowing two large stock (horses, mules, donkeys, cattle) and five sheep or goats to be grazed *gratis*.

Thus, herders are legally entitled to grazing on the common pastures of their commune of residence, but must petition for such access elsewhere. In practice such requests are often denied. For example, since 1965 in the *koinotis* of Didyma in the southern Argolid, access consistently has been denied non-resident herders. Such closure of local commons to non-residents must, however, be based upon demonstrable pressure on the pasture. In the *Vlachochoria*, or Vlach villages of the northern Pindos, a common complaint among transhumant herders about conditions in the winter grounds (*cheimadia*) is that not only is it increasingly difficult to secure sufficient *livadi* by leasing private pasture, but also when they have not established residence rights they are denied the *chortonomi*, or grazing right, in the commons. These shepherds complain bitterly that in the villages of Thessaly, where they overwinter their flocks, that landowners who leased *chortonomi* in both private arable and non-arable in earlier years often allow their lands to go ungrazed as an agonistic demonstration of their wealth and power.

Herders on migration with their flocks are entitled to the free use of a municipality's common pasture as well as fallow convenient to their passage for a period of twenty-four hours, after which they must have left the *koinotis* territory or have secured the necessary pasture by other means. However, such passage invariably brings them into conflict with the villagers and rural guards of these communities and once again the divide between the law and actual practice is dramatic (Campbell 1964; Koster 1976).

Since 1938, even herders who had previously been without permanent political residence rights in any municipality were required to establish these in one of the communes in which they grazed. However, this was a process of negotiation, and many were able to obtain such rights only in the higher communities of their summer pastures (Campbell 1964: 15-16). It is a common strategy to avoid difficulties in securing use of common public pasture for a family to attempt to establish residence rights in both summer highland villages and in the winter lowlands, or *cheimadia*, by having members apply for registration in different *koinotites*.

As important as are the public pastures of Greece to the survival of Greek pastoralism, it must be emphasized that this pattern of tenure has evolved in a

particular historical context. Today, rural Greece is characterized by the people termed "smallholders" by Netting (1993: 2). Typically this fact has been considered the source of many of the problems of Greek agriculture and of the society which it supports. For example, these "smallholders" usually have their holdings dispersed over a range of productive zones and the small size and fragmentation of these holdings has long been viewed as blocking the modern transformation of Greek agriculture (Karouzis 1971; Lambert 1963; Thompson 1963; for a critique of this view see Bentley 1987, 1990; Forbes 1976; Shutes, this volume). Such fragmentation has certainly complicated the task of herders seeking access to large, contiguous tracts of pasture in the arable or non-arable. This has generally been more of a problem for those with larger flocks. Ironically, analysis of recent pastoralism in Didyma (Koster 1977) indicates that such a pattern of private tenure in small and fragmented fields in the most productive lands has been quite consonant with a more intensive and productive pastoralism.

Such widespread smallholding has resulted in a very "packed" landscape. If herders are to put together an area of contiguous grazing in the arable, they must assemble this package from a collection of individual plots with different owners. This is particularly true in areas of higher rural population density as in Crete, Lesbos, western Thessaly, Macedonia, the western Peloponnesos, the Argive and the Ionian Islands. Such a pattern of smallholding has been created not only by the drive of countryside to assure access to land and other productive resources, but also by the process of the consolidation and redistribution of the National Lands (McGrew 1985), the resettlement of the Anatolian refugees, the land reforms of Venizelos and his successors (Servakis and Pertountzi 1933), and the chaos of the Civil War with its resulting redistribution of population and resources. Even in the current era, the wishes of these smallholders cannot be ignored with impunity by those directing the national state and its administration.

The Privatization of Pasture Among Pastoralists

Because pastoralists so often secure pasture as members of corporate descent groups and even polities, there has been a tendency to reduce the question of pasture access to one simply of membership in such groups. A classic example may be found in Barth's (1961) description of the assignment of pasture to tribesmen by the chiefs of the Khamseh confederacy. Among Southwest Asian herders Barth argued that "rights to pastures are held collectively by the members of the tribe or section of a tribe (defined by acceptance, or patrilineal descent)" (1962:342-3). Indeed, so important has this identity between pasture and descent group been that some have even chosen to define pastoralism as "a

system of social relations which combines the principles of divided access to animals and common access to pasture" (Ingold 1980:207).

It is surprising that until recently the question of how herders use and control pasture had not been of greater concern to anthropologists and others interested in the techniques which pastoralists have adopted to survive in a variety of environments. This situation has been reversed by a number of studies. For example, in Southwest Asia, the region from which Barth's type case is drawn, the Shahsevan of Iranian Azerbaijan (Tapper 1979a, 1979b), the Lutfi of southern Iran (Amanolahi 1986), the Qashqa'i of Iran (Beck 1986, 1991), the Central Asian Arabs (Barfield 1981), the Wakhan Kirghiz of Afghanistan (Shahrani 1979), the Bakkarwal of northern Pakistan and India (Rao 1992; Rao and Casimir 1982), and the Yoruk of eastern Anatolia (Bates 1972, 1973) all display forms of individual access to and control of pasture. Richard Tapper's work, in particular, stimulated theoretical interest on how and why privatization of pasture rights develops among pastoralists. In these cases the process of individuation of pasture access often appears to accompany increasing pressure on resources resulting from the closure of national borders, declining availability of pasture, changes in market conditions, expansion of cultivation into former pastures, and government restrictions on grazing (Bradburd 1992:315). Bradburd (1992) and Glatzer (1992) argue that one reason most sheep/goat pastoralists in this region have been described as having little interest in the individual appropriation of pasture is that until recently pasture resources have not been that scarce (contrast to Martin 1982; Nyerges 1982). Bradburd also links the failure of Iranian pastoralists to be notably territorial to the nature of political and economic organization among these groups (Bradburd 1992: 315). The literature on pastoralism in Greece has dealt with such issues for more than three decades. For example, John Campbell's (1964) magisterial description of the "classic" Greek herders, the Sarakatsani, offers a detailed analysis of the process of negotiation for pasture within the web of community, kin and patronage.

The failure of pastoralists to exhibit strong territorial behavior with respect to pasture and often even unimproved water sources has long been explained by the necessity to be able to adjust rapidly to the vagaries of arid and semi-arid environments. What is the use of "owning" ephemeral pasture vegetation or water which cannot predictably support one's animals? The best way for a herder to adjust to such a problem is to practice a strategy of movement, attempting to track temporary flushes of vegetation within a larger territory which may be co-terminous with the range of an ethnic group, tribe, descent group or some other polity in which he is a member. The ethnographic support for this observation is legion (Spooner 1973; Dyson-Hudson and Dyson-Hudson 1980). The pastoral literature is also filled with instances of other motivations for strategies of regular movement including cases like that of the Yomut Turkmen (Irons 1974, 1975, 1994), who had access to agricultural land, but

migrated with their flocks as a political and military strategy in confronting the Iranian state.

Every pasture which has ever been grazed has been claimed at least during the period of its use either by its occupants, or by some other group or institution such as the state, and such claims and rights can never be static. Some system of use rights must be established at least to regulate the period of occupancy of some physical space, whether for the span of an hour, a season, or across the generations. Attempts to categorize these rules neatly must inevitably result in an incomplete view (Casimir 1992:154,157). Such organization of usufruct can often be quite complex and comprehensive, as in the cases of both the *dina* in Mali (Imperato 1972) and the *hema* in Syria (Draz 1978) discussed in Horowitz' (1981) excellent review of the pastoral literature and research priorities for the study of pastoralism.

But why have some herders chosen to assert such individual and private rights in pasture resources and others have not? I shall briefly consider several related hypotheses sharing a broadly ecological explanation advanced by a series of scholars. Don Dumond (1972:296) argued that territoriality among Central Eskimos and fishers of the Pacific Northwest Coast is "...related both to the existence of specific geographical areas that provide dependable and productive resources and to population pressure on those resources." Similarly, Brian Spooner (1973:15) observed that among nomadic pastoralists "the degree of emphasis on personal ownership" of pasture "varies with the amount of investment involved." In a study of the smallholders of the Swiss village of Torbel and their intensive use of cattle, Netting (1976:137) observed that "in the absence of decisive legal or military controls from the larger society, ... land use by and large determines land tenure." He argued that private forms of tenure are optimal when: (1) production value per unit area is high; (2) Frequency and dependability of use or yield are high; (3) the possibility of improvement or intensification is high; (4) the area required for effective use is small; and (5) labor- and capital-investing groups are small (Netting 1976:144). Netting's thesis has received support from the work in the Central Andes of David Guillet (1981) who found strong associations between intensive agriculture and private tenure, and extensive pastoralism and communal tenure.

R. Dyson-Hudson and Alden Smith (1978) have proposed a related model based on what has come to be termed in biology "the economic defendability of resources model." Their hypothesis is that "territoriality is expected to occur when critical resources are sufficiently abundant and predictable in space and time, so that costs of exclusive use and defense of an area are outweighed by the benefits gained from resource control" (Dyson-Hudson and Smith 1978:21). They tested their model on data from the pastoral Karimojong and found a good fit.

More recently this model has been tested by Michael Casimir (1992) against a larger sample of pastoral groups. He found a strong association

between territorial behavior and the abundance and predictability of pasture vegetation. Of course, if (as Bradburd argues for Iran) the pasture is "abundant to the point of being superfluous," there is little point in asserting individual rights of tenure (Casimir 1992:166). Casimir recognizes that these pasture variables are not, however, the only limiting factors, and that "in regions with more favorable ecological conditions the factors history, patterns of social organization, population pressure and the structure of the wider society including the State can overrule and transform strategies eventually employed by pastoralists to ensure continued access to resources" (1992:176). Such factors appear to play an important role in the explanation of particular cases of pasture tenure in Greece, but yet, can we discern any broad pattern within this diversity of practice?

As important as common tenure has been in the Greek pastures, very clearly private tenure has established a firm grip as well, particularly in the arable, but also in the non-arable. But why have these coincident systems of pasture control developed in Greece? To answer this question we must look not only at the environmental variables which allow private tenure to be established in the *vaskotopoi*, but also at the grid of state and market.

Commons or Enclosure?: The Development of Public and Private Pasture in Modern Greece

The history of the process by which pasture has come under the control of the localities is somewhat confused and varied. The assumption that there has been a unilineal evolution in systems of tenure broadly from joint forms to individual has been eloquently demolished by Netting (1993) on the basis of a wide sample of cases. Certainly in Greece the record of the last two millennia provides evidence for the existence of both common and private tenure often being practiced simultaneously as they are today, and it appears that there have been shifts in their relative priority. But as Forbes argues in this volume, it is likely that by their nature records of tenure systems describe formal *de jure* positions and may offer only partial insights to customary practice. This issue is closely related to the recent academic debate over the role of long-distance transhumance in the Mediterranean, with some arguing that until the medieval period pastoralism was essentially local with the strict perimeter defense of pasture resources, and others viewing these borders as more permeable and contending that systems of regional and inter-regional pasture use have a deeper historical pedigree (Chang and Koster 1986; Maggi et al. 1990; Whittaker 1988; see Jameson et al. 1994:596-606 for a specific example from the Argolid).

Ottoman, Venetian, British, and Greek national administration and law have provided a series of legal frameworks within which these rights have

evolved in recent centuries. Oral history in many Greek villages where community pastures are found today asserts a long tradition of customary control of the common (Loukopoulos 1930; Mavrakaki 1985). However, there are other instances, such as the case of the high plateau of Katharo on the slopes of Dikti in eastern Crete, in which the specific cession of these lands by the Ottoman administration to the *koinotis* of Kritsa is recounted (Koziris 1969:78-81). It should not be assumed that such village commons reach back to the foundation of the village, nor that this is a form of pasture control with a continuous history from ancient times. It is much more likely that in times of increased pressure on the resources of the "waste", such as occurred in many of the Greek highland communities during the period of Ottoman rule, that localities sought organized and communal control over such resources in conflict with neighboring communities. It is more likely that Ottoman law supported this practice in Greece rather than caused it. For an example of a case of the creation of such a commons by local communities in Japan under conditions of population pressure and agricultural intensification, see the fine work of Margaret McKean (1982, 1991).

Following the Greek Revolution, the Bavarian-Greek administration was faced with the massive problem of assuming the property rights of the Ottomans and effecting the transition from a system of land use and tenure based on Ottoman law to one based on Roman and Byzantine principles. This was a time of great confusion and transformation. The period of the Revolution and the immediate decades following may be characterized as a "land grab" on the part of the state, and members of national and local elites, as well as by common people who took the opportunity of such chaos to establish rights of use and attempt to convert these to those of private property. The new Greek state, desperately in need of revenue to support itself and to pay its foreign debt, in an economy dominated by rural production looked to the creation of the so-called National Lands to provide this base (McGrew 1985).

Under Ottoman rule, pastures had been held in a variety of ways including by private ownership, by the sultan or state, by religious institutions, and by local communities. As is often the case with pasture, a resource which fluctuates in productivity and availability, in many instances the right of usufruct or *chortonomi* was held apart from the right to cultivate the same piece of land. The *nomi* or *chortonomi* might even be leased or sold separately from other rights in the land (McGrew 1985: 81). The strength of this last custom may be indicated by the fact that even today the word *nomi* retains the multiple meanings of pasture, forage, and usufruct. The word *nomeus* or usufructuary, possessor or owner, also has the older meaning of shepherd. It would seem a reasonable interpretation that because this form of land use was so common that it was to become synonymous with the concept of usufruct.

It is a great irony that in attempting to establish its right to the National Lands the young Greek state relied on the dictum of the Sultan Suleyman which

for centuries had been regularly circumvented in the Greek lands since its promulgation. Under this rule the state formally owned all land, or *miri*, and any self-reproducing vegetation on it, which was not held as *wakf*, or religious foundation land (McGrew 1985:24, 111- 113). McGrew notes that the regency government was particularly harsh in its dealings with pastoralists:

The Bavarian-Greek administration's dictum that all land not proven to be private must therefore be national was nowhere more uncompromisingly applied than to grazing lands. The Ministry of Finance during the first months of the regency instructed its agents in the provinces to accept only the Turkish *tapu* as evidence of a usufructuary right to pasture land. Full private ownership of pastures was dismissed as illegal. All claims not supported by the *tapu*, including undocumented claims of traditional usage, must be disallowed and the lands in question leased for the state's account. This policy was formalized by the law for taxing pastures in December 1833, which assigned to the state the usufruct right to all pastures for which a *tapu* could not be produced. (McGrew 1985:121-122)

This law remained in effect until 1864 when new legislation provided a mechanism for the municipalities of Roumeli to reassert their rights in traditional village commons. In the rest of Greece, however, the original law remained in force although it continued to be tempered by court decisions which made provision for proofs of claims less strict than the *tapu* (McGrew 1985:124).

The result of the changes in the legal system of land tenure introduced by the post-revolutionary governments was a shift from the complex system of overlapping and shared property rights accepted by the Ottomans to a system more characteristic of western Europe with a principle of unambiguous and unitary ownership (McGrew 1985:128). The attempt to fashion a clear division between public and private tenure was created in law, but continued to be frustrated in practice.

In the lands designated as forests the new state also assumed a proprietary interest. Once again the state's agents would have great difficulty in doing more than claiming this right. In practice, there is much evidence that country people were able to expand holdings in these lands when they were in proximity to their fields. McGrew describes the regular practice of burning forest which would facilitate subsequent clandestine clearance.

A decree of 1836 admonished forest officials to keep shepherds out of prime woodlands and to restrict them to areas suitable for grazing but not for tree-planting. In the latter areas they might form encampments and build huts and sheepfolds. The decree made it possible for shepherds at a later time to press claims to traditional grazing rights on once-forested ground by showing that they had brought their flocks there regularly for a number of years and had built sheep enclosures or similar structures. (McGrew 1985:127)

The picture which emerges is one in which some communities have been more successful in securing rights to common pasture than others. In some areas, individuals have been more successful at appropriating land in the national demesne. The fact is that today there is no pasture area in Greece that goes unclaimed, although there are various forage resources which do not approach high levels of utilization. For example, a relatively unused temporary "flush" of forage is the extensive cereal stubble in regions like Grevena in western Macedonia which, although used both by "village" or "local" flocks as well as by transhumant flocks from the *Vlachochoria* has been expanded so dramatically in recent years that these flocks cannot possibly make full use of it. The virtually continuous planting of these cereal fields "fencerow to fencerow" has been supported by ready availability of heavy machinery, chemical fertilizers, and government subsidies. With the use of chemical fertilizers, farmers feel less need for the manure from the flocks.

If we are to follow the line of reasoning advanced by Casimir we would expect to find the highest levels of private pasture in those regions of highest rainfall and pasture productivity and availability. That is, private tenure should predominate where pasture is most productive and most predictable. Even a cursory review of the data in Table 8.1 indicate that this is not the case in Greece. Some of the driest regions of Greece such as the Cyclades and the Capital District and Attika have annual rainfall ranging from below 400 mm to 400-600 mm. The peninsula of Methana described by Clark (1988, and this volume) and by Forbes (1982, and this volume) with less than 400 mm annual rainfall is also a case in point. In all of these regions pastures are predominantly in private hands. Conversely, the strongholds of communal pasture appear to be in areas of higher rainfall such as the Pindos regions of Epiros and Macedonia. Casimir's test of the economic defendability hypothesis does not appear to hold up when tested within contemporary Greece. This is not to assert that Casimir's test is invalid. To the contrary, Casimir concludes that both pasture held communally by a village (his Type IV) and individually owned pasture (his Type VI) are to be found in regions where environmental conditions allow the annual use of a pasture. Although there are some semi-arid zones in Greece, there are few locations in the country where pasture is undependable. Clearly, all of these Greek pasturelands are sufficiently productive and dependable to support either public or private forms of tenure. However, as Casimir points out, access to predictable and productive pasture is a necessary but not a sufficient condition for private tenure to emerge. So what is?

It appears that elements of the models developed by Spooner, Netting, and Dumond (all deriving from Ester Boserup's [1965] argument that privatization is associated with intensification), as well as elements of the economic defendability model, are at work. They all posit that when resources are used intensively and greater quantities of time and capital are invested in these resources that they are likely to be privatized. Where used extensively they are

more likely to be held in common. Is there a parallel to be drawn with Guillet's Andean case cited above? Emphatically, yes. Is there a broad altitudinal gradient in Greece as in the Andes? A very strong association appears throughout Greece between intensive land use and private tenure as well as the inverse. It is likely that this association would be even stronger if the NSSG data separated the national state pastures from the private. When the NSSG land use data are compared by *koinotis* altitude and percentage of common pasture a strong correlation emerges (NSSG 1986:42-43). The greater the altitude of the commune, the higher the percentage of commons. The category of mountainous communes includes those above 800 m or with differences of more than 400 m and with a rugged, broken terrain. Semi-mountainous communes are those below 800 m. Finally, level communes are those situated on a plain with altitudinal differences in small communes no greater than 150 m and no greater than 300 m in large communes. These relatively level communes are found below 800 m. As in the central Andes, a general altitudinal gradient of systems of land use and tenure emerges. The highest Greek communes are characterized by the most extensive forms of agriculture and pastoralism and the plains by the most intensive. I am using the terms intensive/extensive here as a measure of production per unit (either of land or per animal). I am aware that the modifier intensive is often applied to pastoralists who I would term specialized. In Greece, these would include many Sarakatsani, Karagounides, Aroumani etc., who tend to place greater emphasis on animal husbandry than on agriculture.

For example, in Crete the three regions which have the greatest percentage of communal pasture are the centers of transhumant pastoralism on Mt. Dikti in the east (Kritsa), Psiloritis (Anoyeia) and, in the west, Lefka Ori (Theriso and Lakkous). These mountainous communities provide the extensive summer pastures used by the large flocks as they return from the lowland *cheimadia*. In the high Pindos in northern Greece the same pattern is found in mountainous communes, such as Samarina and Perivoli, on the slopes of Smolikas. In such high villages, often with mountainous pasture capable of supporting large flocks, there tends to be a greater separation between the grazing of the *vouna* and the constricted arable.

In lower communes there is more of a tendency for smaller, local and intensive flocks to graze the non-arable on a year-round basis. Often in these communities a pattern of closer linkage between the *vouna* and the fallow where they are in proximity emerges. A good example of this pattern is found in the territories of Pacheia Ammos and Kalo Chorio in eastern Crete where a mosaic of small fields are interspersed through a broken landscape in close proximity to patches of non-arable. These pastures had been exploited for much of this century by small flocks based in folds and *metochia*, or isolated fieldhouses, taking advantage of agricultural resources in the vicinity owned or leased by the herder. When a herder has a heavy investment in an agricultural complex including fields, terraces, trees, threshing floors and buildings and "non-arable"

pasture is contiguous to these holdings, it is not surprising that he should attempt to appropriate that pasture if at all possible. Because of their proximity to other valuable resources in which he has invested so heavily, these pastures take on heightened value for this herder. In this region of Crete such appropriation has happened with a vengeance. This pattern has also been reported by Forbes (1982:135-136) on Methana where it is noted that "in years of scarcity, these private rights are jealously guarded." Where herders make direct investment in pastoral resources it usually becomes necessary and economic for them to defend these resources. Peters (1987) documents the transition from common to individual holdings in Botswana among Tswana herders following the drilling of boreholes by wealthy herders. Such intensifying smallholders have little interest in the "common good", but rather take an entrepreneurial interest in the creation of a personal estate.

As the cultivation of cereals at these isolated *metochia* has declined in recent years and previously hard-pressed local herders have chosen to "intensify" elsewhere by participating in the tourist economy, transhumant herders with larger flocks from Kritsa have increasingly filled this pastoral niche, and now rent and purchase these pastures and fields as *cheimadia*. Although the total number of animals grazing this area does not seem to have changed dramatically, the flocks are fewer and larger. However, these pastures are generally less pressed in that such transhumant flocks only use them on a seasonal basis (cf. Blitzer 1990 for the Lasithi region). It should be noted that this process of use of these lowlands by Lasithiotes and Kritsiotes and by Psilorites has occurred in earlier periods as well. Oral history provides evidence of transhumance from the Lasithi Plateau, Kritsa, Kroustas, Anoyeia and Zonyana for at least the past century. Herders from these villages also transit the vicinity of Vrokastro with their flocks while moving to and from pastures further east. Most of the herders presently grazing near Vrokastro (including all of those who remain throughout the year) trace their descent to the upland pastoral villages of Kritsa, Kroustas, and Tappes.

Another factor which appears to be critical is the degree of pressure on resources. Crete has, over the last century, had one of the highest rural population densities of any Greek region (Kayser and Thompson 1964). Normal responses to such demographic pressure have been strategies of flight or movement to new resources including emigration, colonization, migratory labor, migratory craft specialization, commerce and trade and pastoral transhumance (and the history of Greece is replete with examples of these strategies from ancient times to the present), conflict over the appropriation of local resources (cf. Andromedas 1962, 1965), or intensification of production. In most instances some mix of these responses to demographic pressure on resources will result.

Although with regard to pasture tenure in Greece a broad correlation emerges between altitude, topography and system of tenure, it is important to stress that this is not driven simply by altitude. This conclusion should not be

viewed as an attempt to impose a strict environmental determinism on the data. I would agree with Netting that the underlying cause is intensification of production. It may be that it is more likely that such mountain zones will be exploited extensively, but this need not be the case, as Netting demonstrated in his study of the Kofyar of the Jos Plateau in Nigeria (Netting 1968). Another association which may be observed is that large communes with extensive mountainous surface areas such as Didyma in the Argolid, Anoyeia in Crete, Desfinis on the slopes of Parnassos, are much more likely to have common tenure. The largest communities of this sort are concentrated in Thraki (Mikrou Dereiou, and Arriano) and Macedonia (Silli, and Akladochorio). This may, however, be an artifact of the system of use and the community's ability to defend such large areas which later become reified as the state administration recognized these boundaries. This is most likely when members of localities such as the *koinotis* find themselves in conflict with members of neighboring polities (Mavrakakis 1985; Koster and Koster 1976).

In discussing the development of systems of land tenure among cultivators, Netting (1993: 164) posits "a continuum, from relatively open local groups or villages with extensive territories of long-fallowed land, to somewhat more restricted shifting cultivation with unilineal descent groups claiming and defending corporate estates, and finally to households with rights to heritable smallholdings." Is such a model equally applicable to the development of pastoral systems of tenure in Greece? Although Greece is cognatic in its kinship, many anthropologists have recognized the strength of agnatic ties as well. This certainly is the case in the Argolid where the historical importance of the *soi*, or lineage, has been recognized (Clark, 1988, n.d.; Forbes 1982; Gavrielides 1976; Koster 1977), as well as elsewhere in Greece where lineal principles have been emphasized (Andromedas 1962, 1966; Aschenbrenner 1971; Herzfeld 1983). These lineage-like groups were important in the recent past in terms of securing access to pastoral resources. Such a linkage between descent groups and local resources is frequently reflected in toponyms. Often hamlets of herders are described by the patronym of a major *soi* or lineage associated with the suffix "*-eika*" (although the term is not limited solely to *pastoral* hamlets or localities). For example, in the southern Argolid the pastoral hamlet of Horiza is associated with the Droungas patronym and known as Droungeika. In Didyma, many pasture areas are associated with patronyms—e.g. Balabaneika, Karnezeika, Mizelka. This system of course is not rigid today—the names describe former relations to the land and settlement, which have been mediated through death, sale, inheritance and abandonment. But they are the linguistic artifacts of previous patterns of use and tenure. Although he focuses on the bilateral nature of descent among the Sarakatsani, Campbell (1964) similarly notes the strong tendency for agnatic ties to lie at the core of most herding associations, or *tselingat*.

Where state institutions, such as the agricultural police and courts, were either absent or ineffective in arbitrating conflict and providing security, the reliance on a core of closely-related agnates and herding coalitions (such as partnerships and *tselingata*) became necessary and common in gaining access to pasture. This was especially true under conditions of increasing scarcity (cf. Bradburd 1994). This did not, however, mean that resources were always held corporately, but rather, as Andromedas (1962:67-68) has argued for parts of the Mani, descent groups provided a means of collectively securing both individual members and their family property rights. Members of a *koinotis* in turn could defend the larger territory of their local polity against transgressions by members of similar units, and descent groups served to assure access to more limited resources both within and beyond the commune's boundaries. But what have been the ecological, social and economic effects of this predominance of common and public pasture in Greece? The over-exploitation of commonly held pasture by pastoralists has continued to generate dispute long after the publication of Garrett Hardin's (1968) thesis of the "Tragedy of the Commons." I shall now turn to a brief consideration of the current status of Hardin's thesis and to its application in Greece.

The Tragedy of the Commons Today

Since its publication in 1968 in a short article in *Science*, Hardin's concept known as "the Tragedy of the Commons" has probably been the single most influential concept concerning the use of natural resources. It is a seductively simple thesis which contends that in cases where a resource is held in common, pressure is placed upon individuals to use as much of the resource as possible under the assumption that if they do not, the next person will, thus leading to an inexorable deterioration of the resource. This concept should be familiar to students of peasantries as a scholarly sibling of the "image of the limited good," which posits a peasant world view of a fixed set of resources. Those resources used by one person are taken at the expense of another in a kind of zero-sum game, and it behooves individuals to look to their own best interest and to assume that all others will do likewise (Foster 1965). For Hardin, the only reasonable solution to this potential tragedy is for the resource to be managed by private owners with a rational interest in the maintenance of their property, or by the agents of the state who would be able to establish order in the commons. Part of the allure of Hardin's argument is that it offers the alternative solutions of privatization or state control which are equally appealing politically to partisans of either the Right or the Left (McCay and Acheson 1987: 5; Ostrom 1990).

Hardin used the pre-industrial European village common as his key metaphor for establishing the terms of his argument. He borrowed from the

relatively obscure nineteenth-century English economist W.L. Lloyd (see Romano 1977). On such a common, both Lloyd and Hardin argued, where entrance was open to the livestock of all who wished to graze, the pasture would inevitably be overstocked because it was assumed to be a free good, thus resulting in a tragedy for both herders and environment (Lloyd 1977: 11).

Similar criticism has been levelled frequently at nomadic pastoralists on the assumption that they have little presumed interest in any fixed set of resources and do not practice wise management of their basic subsistence resources—grazing and water (Hopcraft 1981; Lamprey 1983; Picardi and Siefert 1976). It is argued that nomadic pastoralists push these resources to the extreme, and after they are no longer productive move on to greener pastures or are forced to deal with the consequences of a density-dependent crash in their herd numbers. It is also assumed that such “overstocking” will of necessity lead to long-term deterioration of the pasture, a conclusion which has increasingly been challenged in practice (Bernus 1977; Breman and Cisse 1977; Horowitz 1981). Ingold (1980:202, 247-248) has argued that the nature of pastoralism is toward the accumulation of stock which inevitably results in a livestock/pasture imbalance or requires a strategy of mobility often accompanied by belligerent expansion. It is only where livestock are sold in the market and herded on extensive pastures which are owned that Ingold believes limiting herd numbers in an attempt to balance land and animals will be practiced. He views ranching as an inherently conservationist strategy in contrast to pastoralism because of the linkage of livestock and their owners to fixed, owned pastures (Ingold 1980:248). In reviewing strategies employed by pastoralists, Stephen Sandford (1982) has argued that two basic approaches to flock/pasture management may be found among pastoralists. His first strategy (“opportunistic”) is employed in regions with highly variable and unpredictable conditions of rainfall and forage availability. In this case, pastoralists often build herds in anticipation of a crash in numbers due to inevitable drought. His second strategy (“conservative”) is employed often by herders where resources are more predictable and involves an attempt to maintain herd numbers within the carrying capacity of the pasture.

Because Hardin's initial model posited inexorably tragic relationships among herders, their livestock and pastures, it is not surprising that students of such populations have responded. It has provided the theoretical basis for numerous “development” interventions among pastoral peoples by national governments and international agencies, often with disastrous consequences (Swift 1977; Horowitz 1981, 1986; Horowitz and Little 1987; Rigby 1985, 1992). There have been studies which appear to support Hardin's analysis such as Sheridan's description of Sonoran *ejidatarios* and their cattle on common ranges in northern Mexico (Sheridan 1988).

Sheridan's study is a ground-breaking analysis of the conflicts that emerge within the political ecology of what Wolf (1957, 1966, 1981) has called a “closed corporate community.” In this case, all residents of the community, rich

or poor, are entitled to graze cattle on community pastures. However, only the rich are able to supplement this range with the improved pastures and forage from the valuable agricultural land which they also own. Thus, there is an economic incentive for *los ricos*, or wealthy ranchers, to see the commons, which is the sole support of their smallholder competitors, overgrazed and less productive. This practice becomes a way of appropriating necessary resources and denying market competitors their use. Sheridan documents the continual struggle among these groups for control of the commons. This is an example of what has been termed "the tragedy of the commoners," or a situation in which the process of enclosure leads to environmental degradation. Indeed it is very similar to struggles between larger commercial flock owners and commoners prior to enclosure of the English commons (Thompson 1976:338—as cited by Peters 1987:177). Overgrazing is also encouraged by the lack of tending or herding of the cattle as opposed to the practice of "milch pastoralism", as it is termed by Ingold, or dairying among most Mediterranean pastoralists. Because there is no daily monitoring of the animals and pasture there is less capacity for timely response or adjustment of herd/pasture ratios. However, many ethnographers working with a wide variety of pastoralists have found Hardin's model to be inadequate in analyzing their data (Casimir et al. 1980; Gilles and Jamtgaard 1981; Horowitz 1981; Horowitz and Little 1987; Koster 1977; Koster and Forbes 1978; McCabe 1990; Peters 1987). These studies demonstrate that pastoralists regularly have found ways to manage resources and avoid their deterioration under grazing pressure (Berkes 1989; McCay and Acheson 1987).

In a comprehensive review of research on the "Tragedy of the Commons" thesis, Feeny et al. conclude that studies from a much wider sample of resource-use systems indicate that "users have been able to restrict access to the resource and establish rules among themselves for its sustainable use" (1990:1). They add that "many of the misunderstandings found in the literature may be traced to the assumption that common property is the same as open access and Hardin's prediction of the inevitability of over-exploitation follows from it" (1990:5). As Ciriacy-Wantrup and Bishop (1975) have noted, this assumption led much of the earlier research to conflate the concepts of common property, in which access is limited to community members and open access to a resource, in which it is free to all. Hardin's original model unfortunately merged the concepts of *res nullius* (open access), *res publica* (government property), and *res communes* (communal property) (McCay 1990:216).

Feeny et al. proceed to distinguish four types of property rights in what they term common-pool resources: (1) open-access; (2) private property; (3) communal property; and (4) state property (1990:4-5). They conclude that although Hardin argued that only privatization and enclosure of the commons or appropriation and management by the state could provide the necessary incentives and controls to effect a "sustainable" use of Common Pool Resources (CPR):

...the evidence indicates that complex interactions among the characteristics of the resource, the property-rights regime and other institutional arrangements, and the socio-economic environment contribute to the degree of management success. Success in the regulation of uses and users is not universally associated with any particular type of property-rights regime. Communal property, private property, and government property have all been associated with success and failure. (Feeny et al. 1990:12)

Recently Hardin has recognized that local communities have been able to control and manage common resources in a sustainable fashion, and now claims that the title of his original article "should have been 'The Tragedy of the *Unmanaged Commons*'" (Hardin 1991:178). Ironically, he continues to quote Lloyd's description of the degradation of the unenclosed English commons (Hardin 1991:172-173). He makes no reference to the accumulating ethnographic evidence challenging his model. However, he argues that the model continues to be valid for resources such as the blue-water fisheries which exist in the "unmanaged common." Hardin finds the motivation for management of the commons in the principle of shame and argues that as face-to-face, decision-making social groups reach a threshold of 150 members this mechanism becomes less effective and the principle of envy leads to breakdown. He terms this the "Hutterite Limit" based upon the observation that when Hutterite colonies reach this size they divide (Hardin 1991:179-182).

In speaking of the influence of shame, what Hardin is describing is the power of "belonging," *gemeinschaft*, or the moral community. In a world of "globalization," transnational corporations, consumerism, nation-states and international trade and political organizations, such concepts may appear quaint, but as Martin Khor has argued "local control while not necessarily sufficient for environmental protection, is necessary, while under state control the environment necessarily suffers" (as cited in *Ecologist* 1992: 128). Commons regimes are created where the sense of moral community flourishes, where each member is "subject to everybody else's personal scrutiny and sanctions" (*Ecologist* 1992:124). Importantly, commons are neither public nor private. They are resources which are linked to communities, but not those of the distant variety such as the state or "our corporate good neighbors." It may even be preferable to define commons not so much by the type of resource or its domain, but rather through its social organization characterized by "local or group power, distinctions between members and non-members, rough parity among members, a concern with common safety rather than accumulation, and an absence of the constraints which lead to economic scarcity" (*Ecologist* 1992: 125).

The Fate of the Greek Commons

What has been the fate of the commons in Greece? The common wisdom is that these "wastelands" are heavily overused and poorly managed (particularly by overgrazing of small stock), resulting in long-term environmental deterioration (Papanastasis 1983; see Forbes and Koster 1976 for an alternative view). This chapter focuses on common pasturelands. It must, however, be emphasized that this is just one of many uses to which such lands have been put by members of local communities (see chapters by Allen, Clark, and Forbes in this volume for a more detailed analysis of the variety of these uses and their impacts). Therefore, these lands cannot be considered exclusively as pastures (as much as herders may choose to do so), and the history of their management has never been determined solely by this important use. Years later, I recall how vociferously villagers of the eastern Argive Plain defended valuable stands of oregano in their commons from the flocks of migrating Sarakatsani on return to summer pastures who had legal "rights" of passage which dissipated beneath a shower of stones. Similar conflict often exists in the commons between herders and beekeepers.

In the *koinotis* of Didyma a system of pasture use exists in which herders establish localized core areas or home ranges in the *koinotiko* or commons based on *mandria*, or folds which they construct, or lease (Chang 1981, 1994, n.d.; Koster 1977; Koster and Forbes 1978). The term that is often used for this phenomenon is that of a *thesis*, or place or seat. It is sanctioned neither by the officials of the state nor by the local council. By law any resident of the commune has the right of access to common pasture upon payment of the commons grazing fee. This payment provides his flock the theoretical privilege to graze wherever he chooses. Didymiotes vehemently deny the legitimacy of any system other than the *de jure*, and often people will even deny the existence of the *de facto thesis* system. In practice there are real limitations on the ability of a herder to establish himself in the commons without a fold and its attendant grazing area. Herders develop rights of usufruct and even transfer (although informal) to fold sites and to other structures (huts, milking pens, corrals, terraces) they build, as well as to "core" grazing areas in the proximity of these facilities.

This case appears to be in conformity with Netting's (1976) observation that even where resources may be extensive, relatively low both in productivity and in potential for intensification, they most likely will be held in common unless individuals can improve and invest in them. Thus for example in Didyma, where shepherds build folds, milking pens etc., they must know that these resources will be secured. They also "invest" in the quality of their pasture by attempts to intensify pasture production through controlled burning, and expect individual return on these investments. Thus herders recognize such individual rights as "yours" and "mine" but predicated upon community

responsibility and control of a common which is "ours." Normally a herder will maintain at least two of these areas and folds for seasonal rotation. A basis for this practice exists in the natural home range grazing behavior of sheep known as "hefting." Greek herders are very aware of this behavior. They make reference to this fact also for transhumant sheep (Koster 1976, 1977).

Loukopoulos (1930) describes a commonly-heard story of transhumant sheep moving on their own to "their" lowland *thesis*. Prior to migration I have witnessed transhumant flocks' agitation and eventual initiation of the migration (Koster 1976). The importance of linking management practice to animal behavior is recognized by the Jafarabe Fulbe of Mali who maintain an economically "irrational" number of steers to lead their herds "away from a known water source, to the north into the hot July sun. When that sun is glaring, they say, the cattle do not like to leave the smell of water behind them. Only the elder, intelligent steers appear to remember from one year to the next that not only is there water up north under that hot sun, there are delicious grasses as well" (Lewis 1978: 54-55). In a similar fashion many Greek shepherds keep some goats with their sheep to use as lead animals to control the flock. On hot days sheep flocks led by goats will rise much earlier and more easily from the noonday rest. Often herders will hold legal title to fields or facilities adjacent to the common lands and will construct folds in these boundary zones or ecotones. This is particularly true for those herders following a more intensive strategy of production relying more directly on agriculture. The system remains highly flexible because herders enter and leave the occupation, and "territories" may grow or shrink in relation to changes in both the demographics of their flocks and those of their neighbors, a process referred to by Glatzer (1992) as "osmosis." Other herders and their flocks are often allowed passage (especially if they require this easement to reach other parts of their *livadi*), but if the flock carries on its way this may lead to conflict. These core pastures will be defended as pressure is felt.

This system is reminiscent of that described by Acheson (1972, 1975, 1987, 1989) for territories among Maine lobstermen. It is maintained through a similar process of threat, display and violence. Acheson describes two types of territorial behavior. "Perimeter-defended territories" usually develop around islands, with clear boundaries defended by harbor gangs with close and exclusive memberships. These territories experience both larger catches of better lobsters and almost 30% higher per capita economic returns. These gangs limit number of traps, season, and boats. "Nucleated-territories" have more open gang membership, and less closely defended territories. Acheson contends that in the past, most Maine territories were perimeter-defended, and that now the nucleated-territories are increasingly moving toward the status of open-access resources. He points out however, that these territories cannot become individuated (personal private property), because a fisherman needs diverse kinds of bottom to fish effectively (Acheson 1987).

In Didyma today, grazing territories appear to fall somewhat between Acheson's types. That is, generally borders may be more permeable than is the case with his perimeter-defended territories, but they do not approach the degree of access which characterizes nucleated-territories. Most importantly, they are individuated in terms of access and defense. In Maine, such territories can also be defended because it is possible to surreptitiously poach on others (retaliate) and also inflict damage by stealing or cutting traps. This is similar in the Greek setting to the ability to steal grass, and to burn folds or steal animals. In both cases sanctions allow for escalation and strong messages to be sent without directly facing the competitor. It is one thing to have to defend a territory by confronting competitors with direct force. It is another to be able to control their actions by making them too expensive through more indirect means such as cutting traps, stealing grass or sheep or destroying property. Such violence obviously has a degree of density-dependence and the Greek pastoral literature is replete with references to such conflict (Campbell 1964; Herzfeld 1985; Mavrakakis 1985; Koster and Koster 1976). The competition may be precipitated by market factors as easily as by more direct competition for grass to maintain flock size or productivity. Therefore, "density-dependence" may not be measured strictly by factors such as herd/pasture ratios. Greger (1984: 13-14) describes the increase of *zoöklopi* or animal theft in the mountains of Lasithi in tandem with increases in the economic return from herding, a process similar to that described for Sardinia by Moss (1979). The idea that neighbors might be "fingering" the flocks of their local competitors is one that found support among many of the Cretan shepherds whom I interviewed.

This system represents a form of the "tit for tat" response to the famous "prisoner's dilemma" (Axelrod 1984; Ridley and Low 1993). The constant threat of retaliation makes it unlikely that neighbors will fail to "cooperate" in boundary maintenance. This forces them either to expand their territory at the expense of their neighbors or to balance their flock numbers to the pasture which they control.

There is evidence that this informal "territorial" system in Didyma, which mimics a system of private-property rights, has served for some time to maintain a sustainable balance between the community's flocks and its pastures (Koster and Forbes 1978). A problem in the testing of the tragedy of the commons is the measurement of environmental degradation. One may employ measures such as the nature, amount, and distribution of vegetative cover, its biomass, quality, and productivity. Possibly a more simple and important measure is the maintenance of the system over an extended period. Do people continue to be able to operate without significant declines in productivity? Do they have to increase the use of fertilizer, for example, to maintain productivity in agriculture? In Didyma the commons system remains quite productive as measured by the number of animals which it continues to support, as well as by other forms of production in the common lands.

If herders are to follow Sandford's "conservative" strategy (as Didymiotis appear to have been doing) it is necessary for them to have an effective mechanism to monitor the condition of the pasture. The practice of milking offers an efficient device for virtually daily monitoring and immediate feedback. They don't have to "eye" the pasture or "sense" the condition of their animals. The herder literally monitors this production with his hands. This is even more effective when it is done through his own or family labor rather than through hired help. For this reason herders are reluctant to delegate this aspect of production to those beyond an intimate circle of trust and those who do not have a deep personal investment in the flock's success (see Chang, this volume).

Elinor Ostrom (1990: 90) has summarized the conditions which she believes lead to the sustainable use of common pool resources in terms of eight criteria or principles. How well does the use of the Didyma *koinotiko* accord with her model?

(1) Clearly defined boundaries, both for the CPR (Common pool-resource), and for the "appropriator" households or individuals. Both conditions are met in Didyma, as the commune and the *koinotiko* (commune pasture) boundaries are formally recognized by the national state as well as by both neighboring communities and members of the *koinotis*. Herding households and production units are also clearly distinguished and recognized by all "players."

(2) Rules for appropriation (use) and provision (maintenance) must fit local conditions of the resource. Again, in Didyma this condition is met. Both formal and informal rules mesh in providing a local system which allows balancing of flocks to pasture.

(3) Collective-choice arrangements: individuals affected by the rules can participate effectively in modifying the rules. Once again, in Didyma we find this condition met. Herding households are significant in numbers and play an important role collectively in the village with regard to use of these lands, and also influence the acceptance of the informal rules which they and their forebears have created.

(4) Monitoring: monitors who actively audit the CPR must be the appropriators (users) or accountable to them. Once more these conditions are found in Didyma as shepherds monitor one another in the system of boundary maintenance already described.

(5) Graduated sanctions: rule violators will be assessed progressively graduated sanctions by other users or by officials accountable to other users. Generally this, too, holds true for Didyma. Escalating sanctions for "trespass" are employed by neighboring users—theft, threat, firing folds, etc. Formally, violators who, for example, do not pay the grazing fee or exceed appropriate numbers will be sanctioned by the community using the state court institutions. To some extent this process is affected by users. But this is a resort to external force and authority.

(6) Conflict-resolution mechanism—appropriators (users) and officials must have access to low-cost local means of resolving conflict. Although this may appear contradictory, the system of neighbor friction allows local conflict to “resolve” local disputes, and leads to effective boundary maintenance. Here, too, the Didyma case appears to fit Ostrom’s model, if only in a perverse fashion.

(7) Rights of users to devise institutions and control CPR use are not challenged by external government. Here, also, the case is less clear. Technically, the national government establishes rules of use. For example, the local officials of the Forest Service may place limitations on the use of commons resources, but in reality the informal system of pasture use is operative.

(8) All these activities are institutionally organized in multiple layers. In Didyma one finds a series of nested sets of rules and organizational levels operating.

As with most models which describe human behavior and institutions, we find in practice that the Didymiote case of CPR use is in clear accord with many of the principles defined by Ostrom. However, there are several areas in which the case does not fit neatly. This is due to the fact that her model is focused upon the maintenance of concord and conflict resolution. It appears that conflict and the use of threat and force are as critical components in the maintenance of this “sustainable” system of CPR use as they are in the coastal waters of Maine.

How well does the model of the Didyma commons apply elsewhere in Greece? Do other commons work as essentially open-range resources for those who have paid their entrance fee, or does something akin to the *thesis* system develop? I have yet to visit a community in Greece which has a significant expanse of commons in which some form of individuation is not practiced. Again, it is important to note that in virtually every case of a *thesis* system which I have observed, its existence is something which the participants initially deny—that is, when questioned they will always offer the *de jure* system of free access for those who have paid the grazing fee. However, herders when asked why they are grazing in their present location in the commons, invariably begin to explain with reference to some variant of the *thesis* system. This is particularly true where they have made investments in fixed installations such as folds, milking pens, corrals and huts. I have found this system in operation in the highland community of Valtetsi in Arkadia, in the mountain communities on the slopes of Ziria and Aroania in Korinthia; in Crete in the highland communes of Kritsa and Anoyeia; and in the *Vlachohoria* (Samarina, Perivoli, Smixi, Avdella) and throughout the Nomos of Grevena (Koster 1987) where it has also been described by others (Chang 1992, 1994; Chang and Tourtellotte 1993; Sivignon 1968; 15; Skakas 1986). Dimen Schein (1970: 166) describes the Aroumani of Fourka as employing a formal system of allotment by which “the President and Council of the village, together with the shepherds, allot

areas of pasture to each shepherd, but this is a formality, since each shepherd tends to return to the area he used the year before."

There are, however, many reliable ethnographic descriptions of alternative systems of management. Campbell (1964), Loukopoulos (1930), and Mavrakakis (1985) describe various systems of community allotment and rotation of pastures within the commons. Campbell describes the use of *koinotiko* grazing in the Zagoria as a rotational system in which lots within named pastures are allocated annually to different herders by the village president. These pastures are not of equivalent quality and Campbell does not describe anything like the territorial use of the commons found elsewhere.

The rotational Zagoria system has many inherent problems. During the 1950s the Sarakatsani were really still clients in the Zagori villages. If the herders are not secure in their tenure on a particular pasture from one year to another, they lack a particular incentive to avoid overgrazing this assigned pasture while they are using it. Even if they are well-connected politically, there is always the chance that these conditions will change. Indeed, it seems (as Campbell makes clear) that pasture allocation by the village President is a powerful political lever used to control the shepherds. Not surprisingly, Campbell believed that the Zagoria pastures were severely overgrazed in 1954.

In a sense this is more like Hardin's model in that the land is technically "common" but the shepherd who is really a client and in many ways outside the "moral community" (of the Zagori villagers) has little reason to invest in the whole or even in a particular pasture in which he has no secure relations. In a similar case, the villagers of Trikkomo in the Grevena Nomos with fewer than 700 head of goats and sheep kept by locals, have put much of the village's 12,000 stremmata of common pasture up to public auction. In recent years it has been leased by Sarakatsani. Here too, although the herder securing the *chortonomi* has invested in the pasture by securing the lease, because he is not a member of the community with "rights" he has little certainty that he will be able to return in future years to this pasture beyond the period of his lease. Where there are other "open" areas he may be tempted to follow a "frontier" strategy and "mine" the pasture by overgrazing in the short term. Also, when villagers no longer rely directly on the pasture for their own flocks (as in the Zagoria), but rather use them simply as a source of village income providing rents from outsiders and as an asset in the dance of local politics and patronage, these resources are more likely to be subjected to abuse.

Such "public" systems stand in stark contrast to those employed by the people of Samarina, for example, who, although they are shepherds (and often lower in the contemporary class structure), secure their summer grazing in the commons as full members of the web of kinship, religious and friendship/neighbor ties within the local moral community. This is even more the case in Didyma where herders often rely on the commons throughout the year, again, as full members of the local community.

The system described by Campbell for the Zagori is outwardly similar to that described by Loukopoulos in Roumeli during the 1930s or in Fourka in the late 1960s by Dimen in that they all formally involve an allotment of pasture in the commons. They also involve rotation in access to these pastures. It appears likely that such systems of local allotment of the *chortonomi* were widespread in the past. Again, in passing I should note that the very process of allotment or redistribution in Greek, *dianomi*, takes its name from the term for pasture use. However, whereas Loukopoulos describes a process in which the shepherds themselves are closely involved in directing this process, in the Zagori the allotment has become a tool by which village officials can manipulate the Sarakatsani in the construction of patron-client ties.

Does the *thesis* system represent a step toward enclosure of the commons in Greece or is it a means by which the commons may be defended? Why do shepherds who are using behaviors which mimic a system of private property continue to support vehemently the principle of the commons as they do when they describe the system in terms of *de jure* rules? For example, in the Lasithiote community of Kritsa many families hold rights of usufruct in the upland plateau of Katharo, including agricultural fields as well as houses, folds and surrounding pastures. Such rights are heritable and transferable, but ownership resides in the common right of the *koinotis*. In Katharo (Kritsa) those who cultivate the commons pay a fee of 4% of their production to the commune. If fields are fallowed beyond three years the cultivator's usufructuary right reverts to the *koinotis*. This is similar to the rule described by Dimen-Schein for Fourka (1970: 59) by which after five years uncultivated land reverts to the commons. Why do not Kritsiotes agitate for the conversion of these rights of usufruct fully to those of private property? This is what would be anticipated in a society which is noted for its emphasis upon individualism and the autonomy of the family. As we shall see below, the failure to do so is not because Kritsiotes are incapable of strong and concerted action. After all, Greece is a country of smallholders who have, historically, lobbied vociferously for the redistribution of monastic holdings, the National Lands, and for all manner of land reform. But there are no national, regional or community-level movements for a similar breakup of the commons (as have emerged, for example, in the United States).

The facile answer might be that the lands legally belong to the community, and such tenure is supported by the weight of state institutions. It appears that it is just because most communities consist overwhelmingly of smallholders that they continue to support the commons. In a real sense, in these extensively exploited lands villagers have the best of both worlds. The informal system provides most of the advantages of private property while at the same time assuring the advantages of common property through the formal and legally sanctioned system. In practice this allows both individual herders and the community enhanced flexibility in managing the resource. As long as the

commons and the ideology of equal access exist, all community members remain stakeholders—a fact of which they are well aware. It is instructive to contrast a system such as that of Sheridan's Mexican *ejido* of Cucurpe with communities such as Kritsa, Didyma and Samarina. Although there is economic and social differentiation, these Greek communities are characterized by smallholders and differences in wealth do not approach those found in Cucurpe where there are extreme differences among local cattlemen. *Los Ricos*, or the local elite, control irrigated lands and private pastures which allow them to run many more head of cattle, and not surprisingly, these men are constantly urging the breakup of the commons. This policy is actively opposed by many of the community's smallholders who believe they could not survive without access to the commons (Sheridan 1988).

Greek villagers understand that the commons provides a bulwark against the predations of the state, neighboring communities and *oi plousioi*, or the rich amongst them. In communities where the *thesis* system is employed by herders it serves as a very effective and flexible, if informal, mechanism for balancing herd/pasture ratios, thereby encouraging sustainable use. It is also quite efficient in both monitoring resource use and providing for low-cost mechanisms of system enforcement. Are such stable rights of individual usufruct the first step to enclosure? This would appear a logical conclusion. However, the formal rules of the commons continue to provide a potential backstop against appropriation of these resources by any powerful community member. Villagers assert that no individual has the right to "take" common land, except for such customary rights as those associated with folds and grazing territories. They claim that no powerful appropriator could have legitimacy in the commons, thereby using the state sanction of the commons as a way of insuring cover to their locally negotiated system of individual use. This is not to say that elites cannot manipulate these principles—they can and do, but the rules provide for this to be done within the political arena where the force of the moral community may be brought to bear. As long as large numbers of community residents view the commons as playing an important role in their family economies it is unlikely that such a system will represent a transition to enclosure.

It is apparent that in Greece, as elsewhere, commons systems are often managed by localities and their members in a sustainable fashion, and numerous cases may be cited in which Hardin's model is not supported. I now turn to some other effects of the dual system of private/public pasture.

Contrasts in Pasture Tenure—Fences and Methods of Payment

A brief review of these two forms of pasture tenure reveals a series of contrasts. (1) In the commons a herder is legally entitled to access by virtue of residence rights in the community and by the payment in cash of a grazing fee. These rights are secured as a community member, and usufructuary rights may

even be inherited. Common pasture may also be leased at auction from a locality which has a surplus, or permission to graze may be gained by paying a double or triple fee. Under private tenure the shepherd must either hold recognized title to the pasture or lease it. When the herder owns the pasture these rights are also heritable and secure. However, when pasture is leased there is less security in tenure as it must regularly be renegotiated. (2) In the commons, the pasture must be shared formally with others, although as we have seen in practice the herder generally individuates access whether or not this is officially recognized. There is no legal right to exclude others. In private pasture there is also individual access, although this may be shared with others with whom the herder may be associated and with whom costs are shared, as in the *tselingat*. The herder using private pasture does have the legal right to exclude others (if only for the term of the lease). (3) When “damages” occur in the form of “stealing another’s grass” in the commons, the herder must deal with these informally because such theft of a common resource is not legally recognized. On private pastures trespass can be dealt with by both legal and extralegal means. (4) The commons cannot be fenced (except along community boundaries), while private property, because it has been alienated, may be fenced, although this is obviously not required. (5) Common pasture must be secured by the appropriate payment in cash, but private pasture may be obtained through an array of methods. Most Greek herders use *both* the commons and private pasture, with only the smallest house flocks or intensive flocks using only private pasture, and only some of the more extensive flocks relying solely on the commons. The remainder of this chapter will consider the effects of the last pair of contrasts—fencing and method of payment in cash or cheese.

In the intensively used landscape of rural Greece a herder must constantly worry about two sources of conflict—competition with other herders for pasture and potential damage to the property of cultivators. Much of what a shepherd does involves the avoidance of economic and social costs associated with the transgressions of his flock. One Didymiote goatherd explained his willingness to winter his flock at a distance of over five hours from his home in the warmer seaside pastures near Koilada which he had to lease at public auction from the *koinotis* at great expense because it allowed him “on three sides to use the sea as a herder,” reducing labor costs and also the potential for damages. In a similar vein, islands have always attracted herders—especially when they are uncultivated and uninhabited. Here too, the sea provides the most pragmatic and least expensive fence imaginable. Sheer cliffs, ravines and rivers can also serve a similar function, although at times these provide more of an obstacle to herders than to their flocks. Such topographic advantages do not result from the type of pasture tenure.

As anyone who has ever constructed any sort of livestock fencing can attest, even the flimsiest pasture fence involves considerable labor, expense and maintenance. In Greece, even today, it is much more likely that fencing will be

done with the purpose of keeping stock out rather than confining the flock on a pasture. Usually only the most valuable agricultural properties will be fenced. Not surprisingly, the regions in which livestock fencing is most widely practiced in Greece are those with the highest proportion of private pasture, i.e., Crete, and the islands. In these regions stone field and pasture walls from earlier times are not uncommon, but today most fencing of private pastures is done with varieties of light woven wire.

During the past decade shepherds in eastern Crete have taken to fencing their leased *livadia*. These wire fences mark the boundaries of the herder's *livadi*, not necessarily the borders of any individual private plot. The *livadi* may be constructed from a series of contiguous parcels, often belonging to different owners. Because they follow private property lines and not necessarily natural features, fences are often constructed in a fashion that appears haphazard at best. Fencing is normally constructed and paid for by the shepherd when he decides to enclose his leased and owned pasture. In 1990 a 25 meter roll of fence cost 3,000 *drachmes* and steel posts cost 300 *drachmes* each. Materials for one kilometer of wire fence cost roughly \$1,200 U.S. and represented a considerable investment. Credit has been made available for such purposes through the Agricultural Bank of Greece with support from the European Union, and the practice has been encouraged by agents of the Agricultural Ministry. Such investment in a leased pasture is most likely where the herder and landowners have established relatively stable relations. Although the fence technically belongs to the herder, once erected it is generally impracticable for him to remove it. Although this increases the value of the pasture, thus giving the owners more bargaining leverage, it also practically binds the plot and its owner to those others within the confines of the fence.

What are the effects of such fencing? First, the fence allows a herder to dramatically cut down on damages—at least where the fence is maintained. Fences also allow a shepherd, as was mentioned above, to ease the labor required in herding. Where families are smaller, opportunity costs higher, and the occupation of shepherd denigrated, it is not surprising that such labor is at a premium (see Chang in this volume). Fencing often has negative effects. It tends to fix or freeze a particular pattern of pasture use upon the landscape. Because of the considerable investment in fencing, boundaries between pastures become hardened rather than flexible (as in the commons) and it becomes more difficult to adjust pasture boundaries to changes in herd size. Where fences are used to minimize labor they rapidly become substitutes for herders; flocks are less likely to be closely herded which increases the likelihood of the flock grazing inefficiently. Left to themselves the stock are likely to concentrate their grazing in some areas and to undergraze elsewhere. These problems can be alleviated through the use of cross-fencing and rotational grazing, but presently most herders simply construct perimeter fences. However, the practice of

fencing private pasture has only recently become widespread and does not yet appear to have resulted in particularly negative environmental consequences.

Finally, I shall consider an important difference which emerges today between private pasture and the commons—its cost and methods of paying for it. One of the great advantages of the common pastures is that they are relatively cheap for those who have access. In Didyma by 1990 the cost of *koinotiko* had risen to 16 *drachmes* from 6 *drachmes* in 1971. In 1990, however, a shepherd from Goura with a flock of 300 sheep rented a block of 6,000 *stremmata* of common pasture near Tripolis at auction for 200,000 *drachmes*. He used this pasture for two months in the early summer to extend the lactation period of his animals. In the Feneos Basin of the Korinthia, the surrounding communes of Goura, Sivistra, and Kalyvia all have common pastures in the rich *kambos*. These pastures are put up to auction each summer, but the herders from these communities rig the auction by establishing a temporary “cooperative” (really modeled on the concept of the *tselingatō* which they still employ). In 1990 each herder paid 150 *drachmes* per head for this prime grazing. In the same communities herders paid 15 *drachmes* per head for mountain commons that summer. In a very real sense these common pastures provide the base forage for most of the flocks of Greece. But if a flock is to be more productive it must have access to better grazing, and most often this is in private hands. A major problem for herders thus involves minimizing the expense of this private component of their *livadi* (Koster 1974, 1977).

It is an irony that where there is a market in land and one would expect a similar rationalization in leases, herders regularly secure private pasture by exchanging cheese which they produce rather than cash. In the Argolid herders often exchange home-produced cheese for private grazing, particularly in the arable, and they similarly do so in accessing private fallow in the Grevena region. But in both of these cases this represents a minority of their transactions. However, in eastern Crete the exchange of their cheese for private pasture leases is the predominant method employed by shepherds. Why is this so? What advantages are there over a cash transaction for both parties?

Private pasture tenure allows the herder an opportunity to rent grazing land through payments in kind (cheese) or labor by means of barter vs. cash rental. The herder has the advantage in this system of (1) assuring a market for some of his produce; (2) retaining a higher value for his product because he sells the cheese at above wholesale rates for the pasture. This lets him keep more value (especially if he has low opportunity costs) by converting to cheese. It also often allows him to purchase grazing in a credit relation, because the cheese is provided after the use of the pasture, while cash is often required prior to pasture use. The exchange of cheese for pasture also allows him to personalize the relationship through his individual product; every family's cheese is unique. Indeed, herders often had their personal cheese mark woven into the bases of their basket cheese forms (Blitzer 1990:40). His product is also “authentic.” By

trading a higher value, authentic, and personalized product for pasture he is socially reinforcing the economic relation.

The lessor or landowner finds accepting cheese rather than cash advantageous because (1) he receives a desirable product at below retail rates; and (2) he is able to reinforce a sense of personal connection to the "traditional" and "authentic" Cretan lifestyle. Thus, shepherds take advantage of the Cretan symbolic focus on the theme of klephtic autonomy (Herzfeld 1985). Non-shepherds can validate their authenticity as "Cretans" through their own personal relationship with a herder. The more authentic the better. Individual shepherds who are thought to maintain traditional lifeways are honored in Crete by the local cultural associations as living "treasures" of Cretan heritage. Their traditional cheeses are still culturally and economically valued. This is less the case with the traditional cheeses of the Argolid such as *tirovoli*. (Although ironically one Didyma cheese merchant used to turn over his factory to make it for himself after making feta for the home consumption of local shepherds!).

The lessor has another reason for accepting cheese. It is important to understand that much of the private pasture in Crete is *vouno* or rough mountain pasture. It is often held within a pattern of small and fragmented plots. When a shepherd groups these parcels into a *livadi* the owner really has little choice in renting or not if most of the neighboring plots are already committed to this herder. To put it bluntly, in such a case if the owner refused to lease to the shepherd his pasture would probably be grazed anyway. By accepting cheese both parties minimize the chance for conflict.

Finally, it is interesting to note that herders in eastern Crete are very conscious of the advantages of this system. By leasing with cheese they are able to cut their pasture costs by from 25 to 40 percent. They also double their profits from milk by converting it to cheese and marketing it directly throughout the region. In Didyma a small merchant follows a similar strategy and now sells all of his cheese production (from 12 flocks) throughout the southern Argolid by the can to a select private customer list at below retail rates. For him this represented a shift from a lifetime of wholesaling. He has abandoned the wholesale markets to the larger merchants and the cooperatives. This niche marketing is in fact an old pattern in the region although it may be new to him. In 1988 in the Cretan village of Kritsa local herders overwhelmingly rejected the seemingly generous offer for the construction of a cooperative cheese factory with more than 70 percent funding from the European Economic Community. The failure of the Kritsa shepherds to accept this offer appears unwise and to fit the stereotype of irrational, uncooperative, selfish, and backward country people. It could also be viewed as an effective occasion of resistance and maintenance of both individual autonomy and community autonomy on the part of these herders. Both views were expressed in Kritsa, but overwhelmingly herders adopted the latter position and to the chagrin of local authorities the factory was not constructed. The resistance of the Kritsa

shepherds has to be seen as an attempt to keep control of the system in a way which is perceived as being favorable to them. It allows them to deal directly with wholesalers, and even to market their products personally. This allows them to retain more of the profit from their labor. Much more labor is involved in cheese production as opposed to simply selling milk. This strategy is very similar to that of Chayanov's (1986) model of peasant "self-exploitation" in which family labor is not priced at market rates. If a cooperative cheese factory were built, most herders would market their raw milk in this fashion, thus undermining the system by exerting more pressure for cheese to be purchased from this sector rather than in exchange for pasture. Once again, supposedly inefficient smallholders have found a way to compete effectively in the modern world.

Summary

The native pastures of the Greek mountainside and "waste" continue to serve as the backbone for the Greek pastoral regime. More than half of the nation's surface area consists of such lands. Over two-thirds of these pastures are held publicly, either by the localities or by the state, and herders secure access to such public pasture either through right of residence or by lease when permitted.

Most pastoralists in the ethnographic record access pasture through membership in groups ranging from local descent groups to larger-scale polities such as tribes. Such groups maintain collective ownership of extensive pasture areas within which individual members may efficiently exercise a strategy of high mobility adjusting their animals and labor to the vagaries of pasture.

Under what conditions do pastoralists shift to the privatization of pasture tenure? Recent cases appear to accompany increasing pressure on resources occasioned by the closure of national borders, declining availability of pasture, market changes, expansion of the arable, and government restriction on grazing. For individual appropriation of pasture to emerge and be maintained for any time, however, the pasture resources must be sufficiently abundant and predictable to be "economically defensible." That is, the benefits of using and defending the resource must outweigh the costs. It is also hypothesized that where pastoralists invest heavily in pasture resources these will be privatized. Finally, it appears that the type of land use will be the most powerful factor in determining the system of tenure employed.

There does not appear to be a simple evolution in pasture tenure from common rights to private tenure. In Greece both public and private pasture tenure appear to have co-existed for more than two millennia. The institution of the local "commons" is often attributed to Ottoman legal practice. However, it is much more likely that Ottoman law supported this practice in Greece rather than caused it. In times of increased pressure on the resources of the "waste"

such as occurred in the Greek highlands during the period of Ottoman rule, localities in contention with neighboring communities sought communal control over such resources. Following the revolution, the new Greek state appropriated most of these rough grazing lands. Much of this land ultimately devolved as "commons" to the localities, although in other cases individuals successfully alienated it.

In modern Greece a strong association appears between intensive land use and private tenure, as well between extensive use and common tenure. As in the Andes, a general altitudinal gradient of systems of land use and tenure also emerges, with the highest Greek communes characterized by the most extensive forms of agriculture and pastoralism and the plains villages by the most intensive. In lower communes there is more of a tendency for smaller, local and intensive flocks to graze the non-arable throughout the year rather than seasonally. Often in these communities a pattern of close linkage between the non-arable and the fallow emerges where they are in proximity. Where such pastures are located in proximity to other resources such as fields or facilities in which the herder has invested, it is much more likely that such pastures will be alienated from the commons. Ironically, this appears to have happened quite often in areas such as the Aegean islands and eastern Crete even though conditions are drier and pastures less productive. Such intensification of use and privatization of resources is a density-dependent response. In Greece private pasture appears to correlate with high rural population density.

Since its publication in 1968, Garrett Hardin's concept of the "Tragedy of the Commons" has become the key metaphor for the use of common resources. Hardin argued that "commons" would be protected from the inevitable and rational over-exploitation of individual users only by either "enclosure" or conversion to private property, or by the "socialist" solution of state appropriation and management. In recent years his model has been challenged by a series of studies (including the present work) which indicate that a third solution of local community appropriation and sustainable management of the resource may occur.

Many observers of the Greek countryside assume that Hardin's "tragedy" continues to typify the Greek commons. In the Peloponnesian commune of Didyma in the southern Argolid herders have developed an interesting "third way" by establishing informal, localized home ranges in the common pastures focused on their folds. Although this system of a *thesis* or "place" is not formally sanctioned, herders recognize such individual rights as "yours" and "mine" but within a context of community control of a common which is "ours." Use and control of the *thesis* depends upon a shepherd's ability to defend his rights against competitors. This informal "territorial" system in Didyma, which mimics a system of private-property rights, has served for some time to maintain a sustainable balance between the community's flocks and its pastures.

The *thesis* system has been found in a wide variety of communities in modern Greece ranging from the northern Pindos through the Peloponnesos to Crete, particularly in cases where there is an investment in fixed installations. However, the mere fact that pasture is held by a locality in common should not be assumed as sufficient for sustainable use. Where villagers no longer rely directly on the pasture for their own flocks, as with the Zagori villagers who rented to Sarakatsani described by John Campbell (1964), but rather use them simply as a source of village revenue, these pastures are more likely to be subject to abuse.

The *thesis* system has been a very effective mechanism in resisting enclosure of the commons. In these extensively exploited lands villagers continue to have the best of both worlds. The informal system provides most of the advantages of private property while the legal system continues to assure the advantages of common tenure. This practice of individuation of usufruct within a matrix of common tenure provides a very efficient mechanism for managing the resource. As long as the commons and the ideology of equal access exist, all community members remain stakeholders and both the law and community opinion may be used as bulwarks against powerful appropriators.

Two principal distinctions between the use of private and public pastures are the ability to fence and to lease without cash payment. Both of these possibilities exist today only with regard to private pasture. Eastern Crete is one area in which private pastures have been enclosed during the past decade with wire fencing. Such fence is expensive, but it allows the herder to reduce significantly fines for grazing damage and to minimize labor costs. These fences enclose the herder's complement of pasture, or *livadi*, which usually includes many plots of private pasture with different owners. Thus, although the herder is augmenting the value of the landowner's pasture by fencing it, he is also fixing that plot within a particular pattern of grazing. At present it does not appear that fencing has led to many of the negative effects noted elsewhere, although its widespread use is too recent for conclusions to be firm.

Private pasture, because it is often more productive than public, is often more expensive. A major problem for herders involves minimizing the expense of this private component of their *livadi*. One way in which shepherds may do this is by paying for private pasture in cheese which they produce rather than with cash. This has the advantage of being done in a credit relation, and most importantly it allows the herder and landowner to split the cost between the wholesale and retail value of the cheese. Such transactions also take place in a context of social rather than market relations. The use of such methods by small producers allows them to remain competitive within the evolving market economy.

As has been emphasized in many of the chapters in this volume, the rural smallholders of the European fringe rather than representing an archaic or remnant community continue to negotiate means of maintaining their family

economies in a rapidly changing world. I find this particularly encouraging as for more than a quarter of a century I have been privileged to share the lives of the "last shepherds" of Greece. Although their lives have been changed dramatically, these people seem to have a remarkable tenacity.

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A "WASTE" OF RESOURCES: ASPECTS OF LANDSCAPE EXPLOITATION IN LOWLAND GREEK AGRICULTURE

Hamish Forbes

Deforestation has been man's chief crime against nature, and perhaps against himself, in the Balkan peninsula. (Turrill 1929, quoted by Rackham 1983:345)

One or two small [lime—*Tilia cordata*] trees have evidently become accessible—through technical advances in rock-climbing by goats—and eaten to shreds. There is no doubt that lime is a relict tree, extremely palatable and thus limited to cliffs. (Rackham 1983:321)

Introduction

At present the agricultural economy of Greece is changing rapidly. This is not a new phenomenon, but the entry of Greece into the European Union (EU) has increased the already quick pace of change. This is no more than might have been expected, since one of the expressed aims of EU agricultural policy is to support and maintain populations in rural areas, partly by up-grading agriculture.

Other pressures, deriving mostly from western Europe (both from within the EU bureaucracy and from the wider scientific world—itself influenced by North American concerns) have aimed at improving the natural environment. As part of these aims, there have been various initiatives to reforest areas of the uncultivated landscape and to restrict rural inhabitants from exploiting them, particularly for grazing and fuel. It is often forgotten, however, that exploitation of the "natural environment" has been an integral part of the traditional rural economy of lowland Greece for millennia (Forbes 1996). During the period of the Turkish occupation and the Greek state that followed it, a span of over 600 years, most of the uncultivated lands of Greece have been open to all in the

local community to exploit for a wide range of products. This common ownership has been seen by some writers as a cause of over-exploitation: in order to safeguard the environments of such uncultivated lands, banning their traditional exploitation or ending their common-ownership status has been recommended (e.g., Thirgood 1981; cf. Hardin 1968).

Although well-intentioned, attempts to exclude local communities from uncultivated areas will inevitably contribute to the already rapid break-down of the old self-sufficiency of traditional rural communities, which is being caused by the intrusion of the cash economy into the countryside. One of the effects of this phenomenon is the continued draining away of populations from the countryside to the cities, a feature which the EU policies mentioned above are aimed at preventing, or at least reducing. The ways in which this supposedly unproductive part of the landscape has been integrated into local rural economies, and the ecological effects of its exploitation, are the subject of this contribution.

It is important to note at the outset that the uncultivated landscape of modern Greece is saddled with a heavy ideological burden within the native culture—one, moreover, which involves conflicting negative and positive values. Being predominantly found on steep, rocky, thin-soiled slopes, the uncultivated landscape is often described by Greeks as a wilderness—a wasteland (*erimia*). As such it is, conceptually, diametrically opposed to the culturally-imposed order of the cultivated landscape of patch-work fields on level plains, or carefully constructed agricultural terraces on hillsides. Inevitably, being "natural", and apparently uncontrolled, the uncultivated scrub-covered wasteland is often thought of, especially by urban Greeks, as inherently unproductive, simply by dint of being in opposition to the "productive", managed, arable landscape. At the same time, however, it is seen as a place of peace and fresh air, in contradistinction to the anxiety-producing noise and bustle of the smelly, and increasingly polluted, cities.

These contradictions have been no less apparent in previous eras. In past centuries "the wilderness" has been the natural habitat of rapacious brigands, who are seen as a chaotic force opposing the order emanating from urban centers. It has also been the home of hermits—very holy men—and the national heroes who fought the Turks in the nineteenth century War of Independence. More recently, during World War II, these uncultivated areas provided sanctuary for the partisans who fought the occupying Axis forces: there is still a lively debate over whether they should be seen more as brigands or as national heroes.

The uncultivated countryside has for some time been the playground for wealthy urbanites: for example those who turn up specially dressed in smart "hunting outfits". They brandish expensive shot-guns and sometimes manage to shoot partridges, though frequently their "bag," if anything at all, consists of considerably smaller prey. Nevertheless, in the ideology of rural Greece, those

who, like goat-herds, resin-tappers and charcoal burners, gain a living by regularly working in, and exploiting, these wild, uncultivated places are placed low on the social scale; the word *vlakhos*, meaning shepherd or goatherd, is generally used in a pejorative sense (cf. Koster 1977:183; Koster and Forbes n.d.). For this reason, their views are rarely canvassed by outsiders (indigenous or otherwise) who consider the environmental well-being of the countryside as their brief.

The tendency for contradictory attitudes toward the non-cultivated landscape is not restricted to the indigenous ideology. By western Europeans and North Americans it is frequently seen as part of the "natural environment", in opposition to the cultivated landscape. As such it is considered to be the part of the landscape which should not be expected to be productive of humanly-exploitable resources. In the Mediterranean, ecologists define the natural vegetation as *maquis*, which is a general term for a range of shrub plant-associations, usually of evergreen species, which often form dense thickets up to 2 m and more high. Garrigue, also known as *phrygana* in Greece, is a general term for low-growing undershrub plant-associations growing on rocky areas: it usually consists of low shrubs (many of them aromatic). Steppe or pseudo-steppe consists primarily of grasses (both annual and perennial), spring-flowering annual plants, and bulbous and tuberous plants (cf. Baumann 1993:233; Rackham 1983:298-300).

It is generally believed that the widespread *maquis*, garrigue and steppe landscapes of Greece are the result of serious "degradation" by non-natural human interference, particularly in the form of their use for grazing by goats, although also via fuel-cutting, etc. These kinds of views are heavily influenced by out-moded but still popular theories of what the ancient Greek landscape was like, as derived from Romantic period Classical scholarship of the eighteenth and nineteenth centuries, and earlier twentieth century plant ecology, which favored beliefs in monoclimate vegetational communities (cf. Rackham 1983:344-347; a more detailed discussion of ecological issues related to the use of the uncultivated landscape occurs towards the end of this chapter). As a way of bringing a new perspective onto an old issue, this contribution incorporates views from academic areas not usually represented in the debate. Detailed studies of both the present-day situation and long-term historical developments are needed: for this reason considerable reliance is placed on anthropological ecology, historical ecology and archaeology.

Up until now, little consideration has been given to how those households, whose economic reliance on exploiting these resources has supposedly led to this apparent environmental degradation, will find alternative livelihoods. As in many countries less economically well developed than Greece, it is difficult to differentiate the use of the non-cultivated landscape to provide fuel and grazing from other (cultivation) aspects of land use in rural economies.

Moreover, it is often those with the fewest economic alternatives who exploit the non-cultivated landscape most (Soussan 1992:138-139; cf. Madge 1993).

The solution generally suggested for re-introducing a "truly natural" environment in the uncultivated areas of the Mediterranean is the banning of access to these uncultivated areas by rural communities, and often their deliberate planting with tree species (e.g. Thirgood 1981:esp. 123-150). In this way it is expected that "natural" closed canopy forests will eventually replace the somehow inferior "degraded" garrigue and *maquis* plant communities (e.g. Thirgood 1981:11-21, esp. 13).

Underlying this argument there is an inherent contradiction. The success of any re-introduction of a truly "natural" forest environment—generally envisioned as being the opposite of the economically-productive agricultural landscape—is often measured by the extent to which it produces a "genuinely" useful product: lumber. Thus both the cultivated *and* the non-cultivated landscapes are frequently evaluated in terms of human economic advantage, despite claims to be advocating truly "natural" management strategies for the non-cultivated landscape. Few commentators note that agricultural land, which has been produced by the total destruction of natural plant communities in order to support domesticated, hence non-natural (and usually non-native) crop species is, in environmental terms, far more devastated than the *maquis*, or even the garrigue environments which are so readily deplored as "degraded." Thus it is only environments from which a readily-identifiable economic product (arable crops or lumber) can be extracted which are considered in some way "good." The following statement enunciated as a principle at the beginning of the British administration of Cyprus, and "followed by subsequent generations of Cyprus foresters" (Thirgood 1981:128) clearly illustrates this thought-process:

The clearing of forests is not to be regretted on the good soils of the plain, where the forests have been replaced by *productive* cultivation, or on the mountain slopes, where vineyards have been established. The real harm has been done by the ruin, *without resulting profit*, of those parts of the country which were fit only to grow forest. (quoted Thirgood 1981:128; italics mine)

A good example of this thinking—that the only "good" non-cultivated landscape is one which bears lumber-quality trees—can be found in the writing of Thirgood, a silviculturalist with considerable first-hand experience of the Mediterranean zone (1981:v). Although claiming to be writing what he considers to be a discussion involving the whole Mediterranean landscape and environment (1981:v), he makes it plain that for him, "proper" forests produce quite substantial quantities of lumber, making significant contributions to the national economy (1981:51-55, 140-147). By contrast, a species such as the

ubiquitous Aleppo pine (*Pinus halepensis*) which readily forms stable closed-canopy communities in much of lowland Greece is peremptorily dismissed as "misshapen trees, mainly used for resin-tapping" (1981:51).

Despite the contradictions manifested in both the endogenous and exogenous ideologies, however, it is very clear that, under traditional land-use patterns, uncultivated land is not at all unproductive land. In many ways the scrub-covered hillsides, marshes, and other uncultivated lands of modern Greece traditionally served much the same function as what was called "the waste" in the England of the eleventh century AD *Domesday Book*. The uncultivated lands of the forest, marshes, heaths and abandoned arable lands—the waste in the parlance of Domesday geography—were an essential feature of rural communities in medieval England and beyond. They provided grazing, food, fuel, stocks for fruit trees, etc. (e.g., Bloch 1966:6-8, 17-20; Darby 1936:166-189) in much the same way as the uncultivated landscape still does in modern Greece (cf. Rackham 1983:347; Thirgood 1981:15, 142). For this reason I shall on occasions use the term "the waste" as a short-hand for this uncultivated, but nevertheless productive, part of the Greek landscape. This usage is not simply fanciful borrowing from a situation completely different in time and place: the Greek word for 'waste' (*erimos*) is closely related to the word for wilderness (*erimia*) regularly used to describe this environment.

Aims of This Chapter

The intention of this contribution is to indicate the ways in which, and the extent to which, rural communities in lowland Greece have traditionally depended on their non-cultivated landscapes as part of their means of making a living from the countryside. Additionally, I will indicate that, although the level of dependency on these resources is now much diminished in comparison with previous decades, some sections of many rural communities in Greece are still very much dependent on them. Although it must already be apparent that I do not subscribe to the Mediterranean-environment-as-goat-desert school of thought (Thirgood 1981:13), neither is it my intention to argue that the non-cultivated landscape is, or has been, unaffected by the very varied methods of exploitation. Instead it is evident that different plant species within that landscape react differently to different methods and levels of exploitation, and that the relationship between humans and the non-cultivated landscape is a dynamic, complex and changing one. At the same time, however, whole ecological communities (as opposed to individual species) are remarkably well adapted to the Mediterranean climate (Thirgood 1981:21) and are more resilient to some natural and anthropogenic factors than is sometimes believed (Goudie 1990:53-54). In particular, certain individual species and ecological communities are highly adapted to fires, which are now widely accepted to be

an inherent feature of Mediterranean environments *sensu lato*, even though their causes at present are frequently anthropogenic (Goudie 1990:28-33; see also below).

Furthermore, since the relationship between humans and the non-cultivated landscape is a dynamic and changing one, if we are to generate a balanced picture of the situation we must place the humans very much within the total environmental context rather than attempting to exclude humans from the picture. It will thus become clear that claims of "environmental degradation" as a result of the exploitation of the waste in various ways, are often based on the sorts of contradictory responses to uncultivated landscapes noted above rather than on serious scientific study. In particular, few scholars have studied the extent to which local communities themselves control levels of exploitation of their own local landscapes. It is an aspect of the arrogance of the western scholarly community generally that we assume that indigenous communities cannot identify their long-term self interest (cf. Koster and Forbes n.d.). It is often simply assumed that everyone individually will exploit any common resource anywhere to the maximum, irrespective of longer-term consequences (e.g., Hardin 1968). Such a view is sometimes linked to a specific political agenda which views resources under common or public ownership, be they medieval English agrarian resources or American National Forests and Parks, as inherently ineffectively managed in comparison with what could be achieved under private ownership (e.g. Baden and Stroup 1977; Baden 1977; Hardin 1977). Furthermore, the ideology of the western, industrialized world views the extraction of products collected from uncultivated landscapes as "primitive", or "backward" —whether this is practiced in southeastern Europe or sub-Saharan Africa (Madge 1993:33). Ironically, "common ownership" often involves a complex interdigitating system of different use-rights, built up by indigenous peoples over centuries, which act as a very effective set of checks and balances against over-exploitation. Rackham (1989), in his discussion of Hatfield Forest, indicates clearly that in England the medieval forests where complex commoners' rights continued late have fared well as ecological communities. On the other hand, a number of those which became purely private property have been partially or completely destroyed, or else their ecological integrity has been seriously damaged (Rackham 1989:102, 153).

For Greece, those people whose livelihood is most directly dependent on these landscapes are placed at the bottom of the political and economic pyramid, and their views therefore carry little weight, even within the indigenous culture (see above). The positive effects of the exploitation of these landscapes in supporting and maintaining local populations, and also any indigenous management and maintenance strategies, must be carefully studied and evaluated before we advocate returning them to some sort of "natural" state.

Discussion

The Uncultivated Landscapes of Greece

So far I have discussed the "non-cultivated landscape" only in the most general of terms. Even those who have travelled in Greece but little have generally been struck by the variety of non-cultivated habitats which are visible from the road. These differ, too, between different parts of Greece: see, for instance, the comparisons of Crete with Boeotia contained in Rackham (1983). In the lowland parts of Greece, non-cultivated vegetational communities range from Mediterranean evergreen forests to low-growing garrigue (phrygana) or even a stony pseudo-steppe, while in the mountains they range from deciduous or coniferous forests to scrubland, alpine meadows or scree slopes (Polunin 1980:28-47; Rackham 1983:298-322).

In these circumstances it can be readily understood that there is no single "typical" Greek non-cultivated landscape. Rather, there is a wide range of plant communities. These are the result of an interplay between the tolerances of particular plant species and a variety of environmental factors, particularly soils, climate, and above all human exploitation. Many, if not most, uncultivated landscapes have been heavily modified, both intentionally and unintentionally, by human intervention. Thus areas supporting forests can be reduced to low-growing scrub communities by heavy wood-cutting and grazing. High mountain forests have probably in a number of instances been cleared and turned into alpine pastures in recent centuries by the economic activities of woodcutters and shepherds (Halstead 1987:80): reduction or cessation of grazing activity will in time almost inevitably lead to the formation of new woodland (cf. Rackham 1983:324-325). Military action through deliberately setting forest fires, as a way of denying cover to enemies, as is said to have happened in parts of Crete during the Turkish occupation, and more recently during and after WW II in actions against partisans, may also sometimes have been a factor (although see below for the relationship of fire and Mediterranean plant communities).

Grazing by animals, too, will inevitably have affected the supposedly "natural" landscape of Greece, though less than the pessimists claim (Rackham 1983:322-325). Although careful management of numbers of grazing animals can be demonstrated in at least one area over some centuries (see below) (Forbes, n.d., Forbes, in press), over the long term of millennia, grazing has probably had more effect on the environment than any other single human activity (Rackham 1983:324). On the other hand, over the course of years, abandoned fields may support a changing sequence of plant communities leading to genuine forests if humans and their animals do not intervene (Rackham 1983:290-327 is essential reading on this subject).

However, it must never be forgotten that fire, although nowadays frequently humanly-caused, has always been a natural part of this environment,

particularly in the lowland areas. A large proportion of the commonest species found in it are in one way or another fire-adapted. Agricultural communities have existed for no more than 8000 years in Greece: it is therefore unlikely that the large number of fire-adapted species could have evolved in so short a time. Hence the periodic fires that caused the evolution of these species must be accepted as having been an integral part of the natural environment in lowland Greece over the very long term, as they are in many other parts of the world (see below for a fuller discussion).

Thus, far from being in some way "natural" and untouched, the uncultivated portion of the landscape is, and has been for millennia, subject to a variety of modifying pressures, most of which stem ultimately from human activities (cf. Rackham 1983). Even those vegetational communities which seem most "natural", and least touched by human activities, may well have regenerated from "degraded" *maquis* or even garrigue habitats of former centuries or millennia (Rackham 1983:346-7).

Nevertheless, although often characterized as "degraded habitats", *maquis* and garrigue are highly resilient plant communities, considerably more complex in their range of species than the kinds of "original" climax communities that they are claimed to have replaced. Furthermore, in the case of the Boeotian area at least, it would seem that the vegetation has changed less over the last 2,500 years than that of England over the last 1,000 years and that of New England over the last 180 years (Rackham 1983:346; Goudie 1990:380).

Agricultural Land as an Uncultivated Resource

The Mediterranean and Near Eastern regions have a long history of sharp conceptual oppositions between cultivated and non-cultivated landscapes: the desert *versus* the sown, and the mountains *versus* the plain are well-known traditions. Yet reality is more complex. Land not actually under standing crops—e.g. in stubble or fallow—is technically uncultivated, and may provide in some seasons short-term resources, especially grazing, comparable in importance to those provided by the scrub-covered hillsides. The provision of grazing which arable land provides needs emphasis. Because of the conceptual divide noted above, many observers fail to realize the importance of agricultural by-products to stock-keeping enterprises and the close interdigitation between animal husbandry, arable agriculture and arboriculture (cf. Koster 1977:165-166, 167, 316-325, 397-414; Chang 1993). This is to say no more than has been noted above: that it is impossible to dislocate the cultivated landscape from the uncultivated landscape in the traditional agrarian economies of Greece.

Some land may lie fallow for several years at a time yet still be considered agricultural. Indeed, some highly fertile low-lying plains areas seem to have had little or no cultivation over several hundred years prior to the present century. The plain of Troezen, famed for its fertility in antiquity, is a good example,

being described as uninhabited and largely uncultivated in previous centuries (e.g., Miliarakis 1886:195; Pacifico 1686:124; cf. Forbes 1982:54). It was only in the twentieth century, and often only after World War II, that many of Greece's fertile plains, including the plain of Troezen, became intensively cultivated—in many cases as a result of the control of endemic malaria. Malaria was only a problem in summer, however. During the winter months these wide uncultivated expanses provided important grazing resources for overwintering transhumant shepherds (cf. Campbell 1964:13-18; cf. Chang 1993:698; Koster 1977:39-43).

These lands in flat, fertile areas, even when, as in the past, technically uncultivated, are fundamentally different from the thin-soiled, scrub-covered mountainsides, and have been so conceptually categorized. They are different, too, from marshes, the edges of which often support the tall reed, *Arundo donax* (see below). All three types of land have historically provided important grazing resources.

A "Waste of Resources": the Many Uses of the Uncultivated Landscape

The discussion so far has been of the use of the waste mostly in general terms. In this section I wish to examine more systematically what a number of those uses are. In so doing, I wish to emphasize first that it is not an exhaustive list, and second, that in the traditional rural communities of Greece, uncultivated landscapes have been indissolubly linked to cultivated landscapes in the organic whole which is the local economy. Third, not all of the uses listed here may be found in any one community.

The data on the exploitation of the waste for various purposes which are presented in this paper derive primarily from two years of ethnographic fieldwork studying traditional agriculture on the peninsula of Methana in the Peloponnesos (Forbes 1982). They are further supported by data gained from a brief ethnographic foray to Crete and several summers' fieldwork focusing on the agricultural economy of the Southern Argolid (Ermionis Province), also in the Peloponnesos. Although they are an unrepresentative sample, these data have the benefit of being placeable within a context of functioning social and economic systems. Only in this way is it possible to understand the importance to traditional rural economies of the non-cultivated landscape.

Agricultural Land

One use of the waste is for conversion to cultivated land. The terraced hillsides which give so much of rural Greece its distinctive character seem

completely ageless. Yet all were originally carved out of uncultivated hillsides. Large numbers of those visible today probably owe their present form to nineteenth century activities, although so far attempts to date their construction have met with little success (cf. Forbes et al. 1996:83; Foxhall 1996; Rackham and Moody 1992:121,126-129). Today, the construction of new arable land from uncultivated hillsides is a rare phenomenon. When it occurs, terraces are mostly constructed by bulldozers, rather than the toil of hands, backs and levers. It is an irony that, while the exploitation of the uncultivated landscape for grazing and fuel-cutting is generally considered unfavorably, the total destruction of the wild plant communities for the creation of arable land is often encouraged (see above). Furthermore, those modern examples of bulldozer-constructed terraces that I have seen are not generally built in such a way as to retain the soil—unlike traditional agricultural terraces. Most show signs of gully erosion in the uneven mix of soil and boulders on their sides after only a few years: observations in Crete suggest they are highly unstable (Rackham and Moody 1992:129). Nevertheless, in Boeotia, Rackham has observed that comparable banks, here associated with road construction, “usually settle down” (1983:343): this is important support to his argument that in that area evidence for erosion since the neolithic period—which began over 8000 years ago—is scanty (Rackham 1983:343).

Olives and Other Trees

A common element of the wild vegetation of lowland southern Greece is the wild olive tree, or oleaster (Rackham 1983:302). A well-known traditional method of establishing an olive grove has been to buy an area of scrub-covered hillside and clear all the vegetation except the wild olive bushes growing there. These are used as naturally-growing stocks on which domesticated olives are grafted in due course. In parts of the Peloponnesos, where this system was widespread in former years, only if some plants were too close together while there were large gaps between others would transplanting be undertaken. Terraces were built round such trees on hillsides only once the graft had taken and the tree was successfully established.

On Methana in the later nineteenth century, large numbers of domesticated pear trees were also established by the simple expedient of grafting domesticated pear scions onto naturally-growing wild pear stocks (Miliarakis 1886:207). Undoubtedly there are other tree species which respond well in this way under the correct circumstances: although I have been unable to verify the fact, I have been told that domesticated pistachios grown on wild pistachio stocks demand less irrigation water.

Besides this means of establishing cultivated trees, the waste in many parts of Greece has also traditionally provided all the olive tree stocks planted in pre-existing fields. Once the stocks have been transplanted and are well established,

they are grafted with a domesticated olive scion (Gheroulanou et al. 1978:51). Wild pear trees can also be treated as transplantable stocks in much the same way. Where these methods are standard, arboriculture in the cultivated landscape has been totally dependent on the waste for wild root-stocks.

A number of experts on olive cultivation discourage the use of wild olives for establishing new domesticated olive trees—especially the use of grafting onto wild stocks *in situ* (e.g. Pansiot and Rebour 1961:77-79). While their advice makes sense for the establishment of large-scale olive-growing estates, it makes much less sense in the context of small-scale, family-based, agricultural enterprises. The system of grafting on stocks growing *in situ* has the major advantage of not demanding the laborious work of transplanting stocks, with the attendant work of watering them several times during the summer for several years (cf. Pansiot and Rebour 1961:75). Such work usually entails the very time-consuming task of carrying water on pack animals, sometimes for kilometers. Alternative methods of establishing orchards all entail considerably greater outlays of capital. Although techniques of air-layering are known (cf. Gheroulanou et al. 1978:51) and nursery-raised trees can now be bought, also generally consisting of domesticated trees on their own roots grown from cuttings, they are much harder to establish. They are generally considered to be less vigorous, and less drought-tolerant, than wild olive stocks. To establish a significant number at one time generally pre-supposes irrigation or a tractor-drawn tanker for summer watering. All of these considerations demand cash outlays which may be difficult for small-scale family farmers to support.

Construction Materials

Although many *maquis* vegetational communities only produce scrubby bushes no more than about 2m in height, quite substantial trees can be made to grow for the production of construction lumber. Although probably never very common, the practice has been used in a number of places where there is a shortage of naturally-growing tall trees. Scrubland bushes, especially junipers (*Juniperus phoenicea* in lowland areas), can be pruned to a single trunk, the lower branches being trimmed away to produce as tall and knot-free a piece of timber as possible. Other users of the waste, seeing the tell-tale signs of the cut side-branches, know to leave these trees alone. One of the benefits of locally-grown juniper for construction purposes over the local Aleppo pine (*Pinus halepensis*), and other imported varieties of pine, is that it is much more resistant to decay and attack by wood-boring insects. In addition, of course, it can be produced without any outlay of cash.

Thin poles and brushwood. The construction of agricultural and domestic structures in traditional Greek communities also demands a range of other products which can usually be met from the plant communities of the uncultivated hillsides, marshes, etc.

As an example, brushwood (i.e. twiggy branches) has been an extremely important commodity in traditional construction techniques. In the Greek countryside, perhaps its most obvious use has been in the construction of sheep and goat folds: post and brushwood structures which may involve the use of several tons of brush, which must be renewed every few years. Herders will frequently exploit several of these during the year, depending on particular circumstances (Koster 1977:176-178). Nowadays many of these are being replaced by concrete block structures as a result of EU subsidies (Chang 1993:695). Although much less so now than in the past, brushwood is also still occasionally used, laid over thicker beams, to support the layer of mud which forms the traditional roofing material of houses in some parts of Greece (Clark 1995:515). Reeds are also widely used in construction, both for the lighter elements of house roofs and as the main element in the wide array of temporary shelters employed traditionally in the countryside (e.g. Gheroulanou et al. 1978:79).

Lumber and brush for agricultural uses. In the recent past a wide range of items of agricultural equipment was made from wood from the waste: plows, ox-yokes, plank harrows, parts for pack-saddles, tool handles, and even carts, for example. Even such relatively small but essential items as long poles for knocking down fruit from trees (e.g. olives, dried figs, carobs) would mostly come from the waste, either in the form of long, bamboo-like, reeds (see below), or thin poles of juniper or similar trees. In agriculture, stout poles are frequently needed as supports for branches of fruit trees. Smaller stakes have traditionally been used in large numbers as vine-props (e.g. Gheroulanou et al. 1978:13-19, 31-37).

Products from the waste are needed for enclosures other than folds, for keeping livestock both in and out. Brushwood, in combination with poles, has been used as fencing to exclude animals from gardens: placed on field boundary walls it may discourage sheep and goats from invading agricultural land. It is also sometimes tied round the trunks of fruit trees, to discourage goats either from eating off the tops of saplings, or from climbing into mature trees with sloping trunks. Tied to bare trunks, especially of young trees, it reduces sun-scall, and tied round the tops of newly-transplanted saplings, it helps to shade young shoots as well as protect them from marauding caprines.

A variety of scrub species also supplies withes for the wide range of basketry items essential in the traditional agricultural economy. For example, panniers are needed for transporting everything from fresh fruit to manure on pack animals, and harrows have traditionally been made from hurdles in some parts of Greece (e.g. Gheroulanou et al. 1978:17, 83, 88). The plants supplying withes are generally not managed in the way that osiers are in northern Europe, being exploited wherever they grow naturally. The chaste-tree (*Vitex agnus-castus*), like the willow a plant of damp soils, is commonly used to provide withes in southern Greece (Baumann 1993:61-64; Huxley and Taylor 1984:121-

122). *Pistacia lentiscus*, a common component of the *maquis*, also provides very serviceable withes as new shoots from plants which have been recently coppiced (see below for a discussion of coppicing).

Finally, the giant reed, *Arundo donax*, which grows in marshy places and makes a fine substitute for bamboo, has a wide range of uses. Its length makes it highly suited for fishing rods, and extra-long, though not very durable, olive, almond and fig tree beaters. Its ability to split easily lengthwise makes split reed highly suited to basket-weaving (e.g., Gheroulanou et al. 1978:83). Even certain types of sieves—essential in a wide range of sorting tasks associated with agriculture—are made of reed. Aschenbrenner (1972:7) comments on the useful income to be made from the sale of reeds in Messinia, because of their high demand for purposes such as those noted here and for construction (see above).

From the foregoing, it is plain that much of what could broadly be termed the capital equipment on which traditional Greek agriculture has depended would not exist without these inputs from the waste. These resources provided much of the backbone of traditional Greek agriculture: its structures and equipment, though dependence on them is now much reduced. It should also be noted that although the waste in much of lowland Greece consists of what are often considered “degraded” vegetational communities (*maquis* and *garrigue*), it is precisely the scrubby vegetation which is used in greatest quantity: even a small rural community may use several tons annually on average for construction purposes, quite apart from fuel (see below). It has been argued that it is precisely the variety and complexity of this “beautiful and resilient mosaic of vegetation, containing a wider range of species” than the original, unmodified vegetation would have done, which makes it much more useful to local human populations than forests which produce construction lumber of questionable quality (Rackham 1983:347).

Fuel

The use of thin and thick wood from the waste is not restricted to construction: a far more widespread use of the scrub vegetation of the uncultivated environment is as fuel. And although simple cooking may be the use which first enters the mind, it is far from the only one. Even before the advent of fossil fuel to rural communities, some of their fuel supplies did *not* derive from the waste. Prunings from olives and other fruit trees have provided some communities with a certain amount of cooking fuel as well as some heating fuel. Vine prunings also provided a source of heat, being a preferred fuel source for traditional pottery kilns (Matson 1972:213, 219). The press-cake remaining at the end of the olive-pressing process likewise provides a usable fuel (cf. Matson 1972:219), though nowadays it is usually sold for further chemical extraction of the remaining oil. But these sources from the cultivated

landscape are a minor proportion of the total fuel used in large numbers of traditional rural communities: the bulk is derived from the uncultivated environment.

Even a rough attempt at quantifying a household's fuel use is a dangerous undertaking, but informants in the lowland Peloponnesos gave some partial answers (cf. Forbes and Koster 1976:120-123). For instance, approximately 100 kgs of brushwood is needed to fire a traditional bread-oven, which, with the small families which exist nowadays, will provide bread for 3-4 weeks at a time. Hence each family making its own bread will consume approximately 1.5 tons of brush annually just for baking. For heating, a further 2 tons of thicker wood may be needed during the winter months. These estimates are exclusive of the thin wood needed to cook daily meals—at a rough guess at least 2 tons annually. A total of close to 6 tons of fuel may therefore be suggested as a single traditional family's annual needs, the bulk of which (possibly 5 tons) must come from the waste.

Applying these highly hypothetical figures to a small village of 50 households gives a figure of 250 *tons* of fuel alone derived from the surrounding uncultivated countryside. At one level this amount of vegetation removed annually, mostly from the uncultivated landscape, might be argued to be an unacceptable pressure on local plant communities. Nevertheless, for traditional agrarian communities in which cash incomes are relatively low, the ability to provide for much of one's fuel needs without payment is an important consideration. Rackham (1983:326) indicates that wood-cutting of *maquis* species is essentially a form of *coppicing*—the harvesting of a "crop" from a tree at intervals, by cutting it back close to the ground and allowing it to regenerate from the stump. This traditional land-management practice has been used for centuries in England to provide wood for fuel and other uses in rural communities (Rackham 1989:9-11, 75-80, 113-123). Within the context of the English rural economy the practice has not been considered environmentally "degrading." A recent attempt to argue that coppicing is environmentally damaging has been condemned (Giles 1996). After a period of lapse over the past century or so, it is being increasingly re-introduced because of the evident ecological benefits of the practice (cf. Rackham 1989:146-150, 208-213). A contractor specializing in coppicing who lives near me in the English East Midlands informs me that so much coppicing has been re-introduced in the last few years that he expects a "glut" of coppice-wood products in the next five years. In some parts of England the practice never died out: I participated in coppicing when I was a teenager.

In one part of Boeotia, Rackham (1983:230) discovered an example of a deciduous woodland community of Central European type, dominated by oaks. Despite being close to the extremity of its range—hence presumably less resilient to human exploitation than comparable woodlands further north—there was evidence, including the existence of underground oak stools measuring at

least 2.5 m (ca. 8.25 ft) in diameter, that individual plants in this woodland had survived being repeatedly coppiced for centuries. In the evergreen *maquis* communities of lowland Greece, it has been noted that all species coppice easily, and that one ton of wood cut per hectare per year "is not *prima facie* out of balance with what *macchia* [*maquis*] might be expected to produce" (Rackham 1983:326).

Since the 1950s or earlier 1960s, the exploitation of the uncultivated landscape to provide wood for fuel and other uses has been largely restricted to direct household use. Prior to that time, exploitation of woodland and scrubland communities for products for export to urban centers had been relatively widespread. Fuel-wood and especially charcoal (being light and easily transportable) provided both cooking and heating fuel, and lime was used in construction. They all make use of the waste for fuel, either directly or, in the case of lime, by burning vegetation cut from *maquis* and garrigue communities to convert limestone to lime. Until the early post-WW II era, these activities provided a necessary cash element for the economies of numerous poorer rural households in many areas of Greece. Unpublished records held by the Greek Forest Service in the Ermionis administrative area of the Peloponnesos suggest that the annual income from charcoal- and lime-burning during the 1930s was greater than the value of wheat needed to feed the region's entire population (Forbes n.d.; Koster and Forbes n.d.).

These activities, which could be expected to have had a major effect on plant communities, have been banned in Ermionis for some three decades. It is important to note that, on the one hand their cessation over that period has not resulted in a rapid regeneration of full closed canopy forest, and that, on the other, according to forest service personnel, the main reason why the ban was successful was because of the rise of another form of (higher status) employment—work in the tourist sector. Of course, we must not forget that grazing and wood-cutting for domestic purposes in the waste have continued since the cessation of its use for charcoal- and lime-burning. Nevertheless, in the light of comments made above about the ability of local communities to regulate use of their environment, it is important to note that even when charcoal- and lime-burning were at their height, they were conducted only with the permission of the shepherds and goat-herds who used particular sections of the hillsides for grazing their animals. In this way shepherds were able to control the level of exploitation of the *maquis* and garrigue communities: over-exploitation would have resulted in reduced milk yields in their flocks (Koster and Forbes, n.d., and see below).

I do not wish to argue that the exploitation of the waste had no effect on its plant communities, nor that the waste has been unaffected by the cessation of wood-cutting for charcoal- and lime-burning in Ermionis: local informants indicate that it has resulted in the increased height and density of wild vegetation in many parts of the region (Koster and Forbes in press). However,

there is no independent evidence to indicate that previous levels of exploitation were in excess of those necessary to maintain a coppiced resource over the long term. Still less is there any evidence that these higher historical levels of exploitation led to any long-term ecological change. Given the emphasis now being placed on the resilience of Mediterranean plant communities (Rackham 1983:346), the lack of evidence for protracted erosional phases in the region generally since the Neolithic, and the low levels and sporadic incidences of post-medieval erosion in particular, (Jameson et al. 1994:175, 192-194, 412-414), there is little reason to expect that over-exploitation occurred on a wide scale. What erosion has occurred in the recent past has been argued to be a result of soil-loss from agricultural land, not over-exploited scrub communities: for the future, tourism and recreational uses of the area are considered the most likely foreseeable cause of erosion (Jameson et al. 1994:398-399, 412-414). Similar observations have been made for Boeotia (Rackham 1983:326-7). Indeed, as I shall argue below, reduced cropping of wild plant communities in the uncultivated landscape produces problems of its own.

Resins

Another source of income traditionally provided from the waste in many parts of Greece has been resin, although its production has been falling for some decades. It is extracted during the summer months from the Aleppo pine (e.g., Baumann 1993:33), a common constituent of the lowland Greek landscape. The process involves removing a strip of bark vertically from the trunk of the tree, using a small vessel to collect the sap which oozes from the wound. Besides still having important industrial uses, it is traditionally used to flavor wine in many parts of Greece, to produce traditional *retsina*. The mastic-tree, *Pistacea lentiscus*, has also been tapped for its resin. In this case the resin is used as a breath sweetener and as a flavoring for a highly alcoholic drink and a form of sweetmeat.

Food

Traditionally, the waste in Greece has been a direct supplier of certain foods. In line with the findings of ethnographic studies in other parts of the world, only a limited number of the total of potentially edible foods are regularly exploited (cf. Scudder 1971). This is especially true of plant foods. The most regularly exploited wild plant species in the traditional Greek diet are those which add flavor and piquancy to the rather bland staples of bread and olive oil. Thus a wide variety of bitter greens and several species of mushroom are collected on the hillsides, as well as in fallow and cultivated fields. Some of

these plants are considered to be useful merely for food, but others are believed to have both medicinal and culinary uses.

In rural communities they are particularly prized at times of the year when fresh vegetables are not otherwise readily available from local sources, and/or must otherwise be bought (Clark Forbes 1976a; 1976b). A few people gather wild greens to sell in urban centers, whose residents cannot go out to the fields and hillsides to collect their own. But although the gathering of such greens for one's own consumption is frequently considered an enjoyable activity, their sale is considered a sign of great poverty (Clark Forbes 1976c). It is typically engaged in by poor widows. In this fact we can see again that the economic exploitation of the uncultivated landscape tends to be a means of support to the poorest members of the community.

Many of the plants of the uncultivated Greek landscape are highly aromatic. Of these, several are used in cooking, but many more are used as folk medicines, often in the form of an infusion (Clark Forbes 1976b:256-258; see Clark, this volume). Gathering of these aromatic herbs for sale can provide a small but nonetheless significant income for some individuals in some communities. Although not considered an occupation only for the destitute, wealthier rural residents and visiting urban relations generally only gather them for domestic consumption.

Besides providing a great deal of useful vegetation, the waste also contains a variety of edible animal species, such as hares, and partridges; birds considerably smaller than partridges are also caught. By and large, however, the larger the prey, the more highly it is prized: the catching of small birds—sparrows and the like—is these days normally left to small boys. Of course there are many other animal species in the waste, but predators, carrion-eaters, reptiles and insects are considered inedible for civilized people. Snails, on the other hand, are collected and eaten as a delicacy. Their sale, too, provides a cash income in some parts of Greece.

The larger prey, particularly hares and partridges, are caught by shooting. For villagers, the ownership of a gun has been something of a luxury. As well as the high cost of the gun, there is the cost of the ammunition and the license. The amount of game caught is also small: quite apart from the limited time available for hunting in the agricultural year, there are not large numbers of game animals or birds in most parts of the Greek countryside. For the urbanite, on the other hand, hunting is an opportunity to flaunt his status in the rural setting. Car ownership has until quite recently been restricted to the wealthy minority, so simply arriving in the countryside in one's own car has been a status act. The urban hunter also often dresses the part: expensive high leather boots and frequently a full American-style "hunting outfit", along with an expensive shotgun. Given that the size of the bag is usually paltry, the urban hunter seems to be aiming primarily to impress neighbors at home and villagers

in the countryside. For these people the waste provides recreation and prestige rather than financial support.

Grazing

The use of the uncultivated landscape as a grazing resource has been seen as a major cause of "degraded" Mediterranean environments for many years (e.g. Thirgood 1981). In addition, the periodic forest fires which are a well known feature of the Mediterranean landscape in summer (see below) are often ascribed to the activities of herders, who are believed to be constitutionally antithetical to forests and wish to improve their grazing at the expense of the natural environment (Thirgood 1981:75 is particularly instructive; cf. Forbes and Koster 1976:123). Even if one does not accept such simplistic arguments in their entirety, Rackham's (1983:324) observation for Boeotia ("of all human activities, livestock-keeping has undoubtedly been the most influential on the wild vegetation ...") is likely to be equally true for much of the rest of Greece. Nevertheless, there are a number of publications which refute the old-fashioned idea that Greece is a land whose extensive noble forests have been irreversibly destroyed by ignorant shepherds and goatherds. Rackham (1983) is particularly persuasive, but there are other studies (e.g., Forbes and Koster 1976; Jameson et al. 1994:189-194; Koster 1977; Koster and Forbes, n.d.). A comparable argument in defense of the goat in Turkey was made some 30 years ago (Kolars 1966).

It is important to bear in mind when discussing the apparently deleterious effects of grazing on uncultivated landscapes in the Mediterranean zone, that relatively little systematic scientific study has been applied to the effects of grazing on plant communities. One of the very few exceptions to this rule emphasizes the important short- and long-term effects of browsing on vegetational communities, but notes that the change in their structure had been completed 2500 years ago (Rackham 1983:346). Many of the claims of "degradation" of plant communities via "uncontrolled grazing" relate primarily to "gut" feelings of what a "proper" natural environment should look like. Moreover, they are often based on global theories, such as the "tragedy of the commons" with little reference to specific case studies (for a critique of such approaches, see Koster 1977:181-2, and this volume). They are also generally based on the outmoded visions of the landscape of Classical antiquity and/or theories of vegetational communities (e.g. Turrill 1929) referred to in the Introduction. There is often little consideration of the stability of local plant communities, or study of plant diversity, or even whether soil erosion is actively occurring due to depleted plant cover or lack of root systems to anchor the soil. In addition, studies which argue that grazing does not generally cause major environmental problems have largely been ignored (e.g. Kolars 1966).

In a very large part of rural Greece, use of the uncultivated landscape as grazing, for sheep and above all for goats, provides an income to those who might otherwise not be able to support themselves on the produce of their own agricultural land. Were it not for this option, some of these households would be near-destitute, and/or forced to leave the countryside altogether. Ethnographic and historical studies in the southern Argolic peninsula of the Greek Peloponnesos indicate that local populations do not have any automatic tendency to overgraze their environments. Detailed studies by Koster (1977) indicate that various social, economic and biological mechanisms ensure that grazing resources are not over-exploited. In particular, two features stand out. One is the interdigitation of local-level agro-pastoralists with seasonally-appearing transhumants, which ensures a reduced level of grazing at times of the year when grazing resources would otherwise be most under pressure (Koster 1977:72-82; Koster and Koster 1976). The other is the explicit understanding that herders' livelihoods depend on an adequate plane of nutrition for their flocks, which in turn depends on controlling the numbers of animals grazing particular areas of the waste. Herders ensure this via the maintenance of exclusive grazing territories (Koster 1977:181-185; Koster and Forbes n.d.), traditionally controlling other, non-pastoral, aspects of the exploitation of the waste in the process (see above). Traditionally, when animal numbers exceeded the ability of the mountain grazing to support them adequately, there was a significant increase in stock mortality (Koster 1977:167-168), which kept stock numbers in a rough equilibrium with grazing resources.

Historical sources for this region indicate that the need to ensure adequate nutrition in their flocks has meant that herders have carefully controlled the numbers of animals supported by the waste over considerable periods of time. Detailed analysis of annual tax registers has shown that herd numbers in one community fluctuated only within very narrow limits over a period of 35 years (Koster 1977:170-175). On a regional level, it is possible to demonstrate that numbers of sheep and goats have been maintained at essentially constant levels for some 300 years, despite huge social, political and economic changes in the region (Forbes n.d.).

Against the background of the establishment of long-term controls against overgrazing in this region, we must place the value of the waste as a support to rural livelihoods by way of a grazing resource. In the rural community studied by Koster, 51 of a total of 431 households (12%) kept herds of goats, the animal most heavily dependent on grazing the waste in the early 1970s (Koster 1977:99-101, 170). In addition, 90 households (21% of the total) owned flocks of sheep, most of which were at least partially dependent on grazing the waste, although to a lesser extent than goats. Thus in this one community, approximately one third of the households depended on the waste to a greater or lesser extent as a grazing resource for their animals. My own studies in the

area in the 1980s indicated that there had been only minor changes to this picture in the intervening decade (Forbes n.d.).

The Effects of Exploiting the "Waste": A Discussion

This chapter has indicated that the vegetation of the uncultivated landscape of Greece has been profoundly affected by various factors associated with the presence of agricultural communities. Nevertheless it is also clear that plant communities are resilient rather than stable, that *maquis* communities in particular survive even very intense exploitation, and regenerate readily once exploitation levels are reduced. Furthermore, once the old notion of Greece as a land full of noble climax forests in the days of Homer has been abandoned, we can accept that the basic structure of the uncultivated landscape of Greece has changed relatively little over the last two millennia or more. Thus the exploitation of this landscape for provision of fuel, and above all for grazing, cannot be shown to be the cause of widespread irreversible change, and, under traditional nineteenth and twentieth century land-use methods, erosion is not normally a problem. Furthermore, where erosion can be shown to have occurred, its causes are either not readily identifiable, or may be related to arable agriculture—although even this latter explanation is disputed (Rackham 1983:343-344). Detailed studies in the Southern Argolid indicate that by far the greatest amount of erosion occurred during the Pleistocene, which ended some 10,000 years ago, several millennia before the appearance of agriculture (e.g. Jameson et al. 1994:183).

Contrary to expectation, evidence from Boeotia indicates that while intense browsing by animals, and wood-cutting by humans, reduces the height of *maquis* communities, it does not convert them into "degraded" garrigue. Most shrubs in this vegetational community are not killed by browsing, cutting or burning, as noted above: whether vegetational communities are composed of *maquis*, garrigue or pseudo-steppe seems to depend primarily on soil moisture, not human exploitation (Rackham 1983:304-305). Also contrary to expectation, evidence that removal of plant cover due to wood-cutting or browsing leads to increased erosion is at present hard to find in Mediterranean environments. There may indeed be a link, but thus far it is not proven and the exact causes of erosion, and the role—if any—of the presence of trees in combatting it, are not obvious and are very poorly understood (Rackham 1983:343; Thorne 1988).

Much of the scrub and tree vegetation of lowland Greece is both fire-adapted and readily combustible in the summer heat (Goudie 1990: 34, 53-54). Fires are a regular occurrence, although again, detailed studies suggest that they are less frequent and less destructive than some pessimists claim (compare Thirgood 1981:65-67, 144-147 with Rackham 1983:325-326, 335-336), and that shepherds are not to be automatically blamed as the main culprits (Forbes

and Koster 1976). In recent times, however, a large number of these fires seem to have had human origins. Such fires are normally viewed as a major problem, both environmentally and economically, and observers regularly blame human greed, stupidity and lack of care for their occurrence (cf. Goudie 1990:28-31; Thirgood 1981:65-67, 126, 133). Nevertheless, a detailed study in the south of France indicated that escapes of fire from garbage dumps and spontaneous fires together equalled the numbers associated with agriculture *sensu lato*, and that carelessly discarded cigarettes and, above all, children playing with fire were each responsible for a much higher percentage of fires than agriculture (Goudie 1990:30). There is also a well-established tradition of incendiarism related to political protest in parts of the Mediterranean such as Greece and Cyprus (cf. Thirgood 1981:131,133, 143-144).

Nevertheless, despite the fact that studies in semi-arid and Mediterranean environments *sensu lato* indicate that nowadays the majority of fires in the uncultivated landscape have a human origin, naturally-generated fires (e.g. lightning strikes, spontaneous combustion) are also well documented, and in some regions of the world may predominate (Goudie 1990:28-31). Furthermore, it is evident that fire has been an integral part of many environments for far longer than the few thousand years since the domestication of plants and animals. Thus tree-ring studies in the U.S.A. indicate that fires were a regular feature over wide areas in pre-Columbian times, with a frequency-rate in many areas of more than once every 20 years (Goudie 1990:28-31). The long history of fires in these sorts of environments is evidenced by the well-known fact that many plant species, including many in the Mediterranean zone *sensu stricto*, are highly fire-resistant, and others are actually benefitted by fires. Among this latter group, fires improve seed germination of some species and actually trigger seed-release in others. In Greece *Quercus ilex* and *Q. coccifera* are especially well known for rapidly sending up suckers after burning, while some *Cistus* and *Erica* species and the widespread *Pinus halepensis* are considered to be positively favored by fire (Goudie 1990:53-54; Rackham 1983:325). It has also been argued that forest and scrub fires can be beneficial because they control build-ups of forest insects, parasites and fungi. Even more important, studies indicate that areas subject to fire often show greater species diversity, which is a critical feature in community stability (Goudie 1990:33-34).

The above observations explain why there is now an active debate in many parts of the world about the wisdom of fire-suppression policies. Thus, in plant communities in California comparable to those found in Greece (chaparral), rigid fire-suppression policies have led to reduced vegetation diversity and a build-up of combustible plant matter (Goudie 1990:32-33). Furthermore, it is now understood that where fires occur frequently, they do not attain particularly high temperature levels because there is little build-up of combustible material. On the other hand, where fires have been deliberately suppressed, when they eventually occur they are exceptionally hot because of the large reservoir of

combustible material: in these circumstances they can be ecologically disastrous (Goudie 1990:31-33).

In light of the above, therefore, it should be accepted that periodic scrub and forest fires have a history which long predates agriculture in the Mediterranean region. In many parts of Greece, naturally-generated fires will have maintained wild vegetational communities in a state well short of full forest growth for millennia, irrespective of the effects of other forms of human exploitation. In the recent past, however, it is quite clear that most fires have had a human origin.

The removal of moderate amounts of vegetation from *maquis* and garrigue communities via grazing and wood-cutting may actually be environmentally beneficial under the conditions of Mediterranean fire ecology. When the vegetation grows very high and dense it becomes liable to catastrophic damage by intense heat when fires occur. If there is less fuel for the fire, the heat will be less intense and the threat of major damage reduced. There will likewise be a better chance of extinguishing fires under these circumstances. Furthermore, as Rackham (1983:299) notes for Boeotia, a typical lowland Greek hillside (especially under conditions of human exploitation) at present contains a patchy mosaic of *maquis* clumps, some 2-5 m (ca. 6-16 feet) across, interspersed with patches of garrigue and steppe. Fires can spread less rapidly here than in closed-canopy forests. Under these circumstances, a regime of wood-cutting and grazing for local needs may be particularly beneficial. It would provide economic support for local rural communities, reducing the pressures on emigration to towns and cities. It would also help to maintain the uncultivated landscape of the hillsides in a more stable relationship with the periodic fires which have always been a feature of the Mediterranean environment.

Conclusions

1. The exploitation of the uncultivated landscape of Greece to provide local communities with a wide range of products is important today and was much more important in the past. In the days when there was a high degree of self-sufficiency in rural communities—a period which in most parts of Greece did not end until after the middle of this century—the exploitation of the waste was completely integrated with agriculture as a livelihood for most rural populations. Until that time, too, urban populations were heavily dependent on the uncultivated landscape for provision of fuel and building materials such as lime. Even today, when the high levels of self-sufficiency found in the past are breaking down, many households in rural communities are heavily dependent on the exploitation of the waste for a wide variety of needs. Those most dependent are those whose status tends to be lowest and livelihoods generally

most precarious. Banning most traditional forms of exploitation of the waste would hit those least able to support themselves by other means.

2. The firmly-entrenched view of the present-day uncultivated landscape of Greece as grossly degraded by human overexploitation owes much to out-moded views of phytosociology, historical ecology, and classical scholarship. It also tends to be dominated by unconscious or conscious economic teleology, in which the only "good" landscape contains a mix of arable land and lumber-quality trees. Although much detailed scholarship remains to be done, it is clear that the supposedly degraded landscapes of much of Greece are highly resilient to human exploitation, and resistant to the kinds of degradation normally claimed. In addition, where evidence of erosion has been studied in detail, it is plain that the majority occurred long before the establishment of agricultural communities. Finally, the rapid social and economic changes that have occurred in the second half of the twentieth century mean that there is now far less dependence on the waste than in the past. Those who see the waste at the present time as grossly overexploited fail to recognize that in many areas it is far less exploited than in the past, and is undergoing a process of change whose end has yet to be reached.

3. Partly because of western attitudes to indigenous peoples which tend to ignore native views of their environments, there has been little attempt to understand whether local communities in Greece are capable of sustainable exploitation patterns in the uncultivated landscape. Although meager, there is some evidence to indicate that the long-term maintenance of tracts of the waste by rural communities without serious long-term damage is part of traditional land-use strategies. Allowing exploitation of the waste by rural communities gives them a stake in the maintenance of the uncultivated landscape. To exclude local communities means that they no longer feel any necessity to maintain it.

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WILD HERBS IN THE MARKETPLACE: GATHERING IN RESPONSE TO MARKET DEMAND

Mari H. Clark

Introduction

Systems of classification provide order and simplify analysis. Applied in a linear, rigid manner, however, they can also limit our thinking about the processes that form and change the categories that constitute the system. Many anthropologists have based stages of socioeconomic evolution on predominant modes of production such as hunting and gathering, hoe agriculture, plow agriculture, and market economies within centralized states. In actual practice, the means of livelihood from an earlier stage often continues into a later stage even though that mode no longer predominates. For example, while linear schemes categorize the gathering of wild plants in a stage prior to the beginning of agriculture, the gathering of wild plant resources frequently continues to play an important role in hoe and plow farming economies. Wild plants may supplement agricultural staples as seasoning and provide sustenance in lean times in the agricultural cycle (Clark 1976a, 1976b, 1976c, 1977). The harvesting and sale of wild plant produce can also provide a source of cash for smallholder households; wild plant products can even become significant exports for national economies.

This chapter presents data from Methana, Greece to support the argument that the gathering of wild plants, usually categorized as pre-agricultural, can be a smallholder agriculturalist's response to market demand for specific wild plant products for seasonings, pharmaceuticals and other uses. As defined by Robert McC. Netting, "smallholders are rural cultivators practicing intensive, permanent, diversified agriculture on relatively small farms in areas of dense population." Smallholder households produce a significant amount of their own subsistence, generally participate in the market, and allocate time and effort,

land and tools in response to changing climate, resource availability, and markets on a daily basis (Netting 1993:3).

In this chapter, I document the way in which smallholders on Methana integrated the wild and the sown in farming and marketing their produce; I demonstrate how the marketing of herbs served one of many economic strategies pursued to cope with the unpredictability of the weather and the market as smallholders struggled to provide for basic needs and produce a surplus to buy property for their progeny. A brief overview of the history of wild plant harvesting and marketing in the Mediterranean is followed by the history of oregano marketing on Methana, which emerged during the transition from a smallholder semi-subsistence economy to a service-oriented economy; Methanites responded to increasing demand for herbs created by the growth of local tourism and expansion of nearby Athens as a major economic center for Greece (Clark 1977, 1988, 1996). This analysis includes the marketing channels for produce and wild plants, as well as the socio-economic and ecological effects of oregano harvesting and marketing on Methana.

Harvesting and Marketing Wild Plant Products in the Mediterranean

Wild plant resources such as spices as well as raw materials such as gum mastic have played a significant role in Greek trade since the early fourteenth century. Gum mastic (for liqueur, paints and medicine), valonia oak acorn caps (processed for tanning), scarlet grain *Kermes vermilio* (a red dye) and briarwood *Erica arborea* (for pipes), licorice, pine pitch, and resin were some of the major wild plant resources exported from Greece (Beaujour 1800:162-165; Dorizas 1925; Gennadios 1915; Grispos 1973; Leon 1973; Mansola 1867:79; McGrew 1985; Stavrianos 1958:273-277).

The harvesting and sale of these resources fits a general Mediterranean pattern of intensive care, gathering, and marketing of wild plant and shrub products. In some cases such as cork harvesting in Southern Spain or gum mastic "cultivation" in Chios, wild resources require as much labor as the cultivation of domestic crops such as olives (Aschman 1973:365). The gum mastic trade was important in Chios as early as 1349 when, under Genoan rule, a joint stock company monopolized that trade. Later, during Turkish rule, special officials oversaw taxation and other aspects of gum mastic trade. Smugglers of gum mastic faced severe punishment such as losing a hand or even death.

In *Travels in the Morea*, Leake (1830) describes the collection and sale of valonia acorn cups by peasants in Mani (Southern Peloponnesos) and the subsequent exploitation of the gatherers by a wealthy Greek patron who loaned

them money at high rates of interest. Leake noted that the local merchant credited the peasants with 13-14 piasters per millage (10 cwt) of valonia acorn cups against their debts to him. By Ottoman law, the local bey had the monopoly on the export of valonia acorn cups. The merchant also held the bey in his debt. The merchant bought all the bey's acorn cups at 25 piasters/millage and sold them to ship merchants for 35 piasters/millage. A great part of the valonia acorn crop was shipped to England for use in tanning (Leake 1830:240-241). Similarly, acorn cup collection was important on the island of Keos from the days of Ottoman rule into the twentieth century, when the demand for acorns declined and the island experienced economic difficulties (Sutton 1991).

The Greek Oregano Trade

The collection and use of oregano in Greece dates back to ancient times. Discorides and other scholars of classical Greece described uses of oregano in their herbals. In the early twentieth century the essential oil extracted from oregano (called red thyme oil) was a lucrative export of Cyprus. Oil of oregano has been used for ailments ranging from toothache to cold congestion (Gennadios 1914). Oil of oregano is still produced in Greece for industry and export.

Today, many Greeks use an infusion of the leaves boiled in water to combat colds, settle stomachs and maintain general health (Blum and Blum 1965; Gennadios 1914; Niebuhr 1970; Voulas 1973). As a seasoning, oregano is sprinkled liberally on nearly every Greek salad as well as meat and fish. Oregano, like thyme, provides excellent nectar for honeybees, producing a dark, bittersweet, high-priced honey. Oregano is used in Greek packaged and canned foods, soap products, and pharmaceuticals.

By the 1970s, Greece was a leading exporter of oregano. The United States buys the greatest amount of Greek oregano. Over the past two decades, European countries, Australia, and Japan have increased their demand for Greek oregano. In response to this demand some farmers have cultivated oregano since 1970 in Thessaly, Thrace, and Macedonia. Wild oregano continues to provide roughly 80% of the oregano exported. In 1971 Greece exported 1,148 metric tons of dry oregano and mint at a value of 25,403 million drachma. In 1985 the export was 1,376 metric tons at a value of 394,719 million drachma (National Statistical Service, trade 1971, 1985). These figures are a bit deceptive because between 1972 and 1986 the value of the drachma relative to the dollar declined markedly, from \$1=30 drachma to \$1=150 drachmae; thus the profit in 1971 was \$838,000, but only \$281,000 in 1985.

At the regional level, *Nomos Argolidos* reported 350 tons of high quality green wild *rigani* (oregano) collected in 1985 in semimountainous areas. In

Argos there are two small firms that process oregano for export to the United States, including *rigani* gathered in other *nomoi*.

Shepherds from Arkadia in the central Peloponnesos, who winter their flocks in the Argolid, gather oregano around their summer pastures in the high mountains above Tripolis. They market the oregano through shops in upland villages. With recent improvements in the transportation system and an increase in the demand for oregano, they have intensified their gathering efforts (Koster and Koster 1976). Exporters also send trucks to collect oregano in this area to fill foreign orders. In 1985 Arkadia reported oregano production of 150 tons (dry) *rigani*.

The Ecology of Wild Oregano on Methana

Oregano, a perennial in the mint family, is native to the Mediterranean. Oregano is well adapted to Mediterranean climates such as that of Methana with its hot, dry summers (93-72 F July mean temperature), moderate winters (41-51 F January mean temperature) and low rainfall (17.5 inches in 1973). The soil is largely volcanic andesite and dacite which is more water retentive and fertile than the limestone soils that constitute the lands of most of the Argolid and the rest of Greece (Greek Institute of Geology and Mineral Exploration 1984; Great Britain Naval Intelligence 1944).

Vegetation on Methana ranges from evergreen forest (aleppo pine, holm oak, kermes oak, lentisk, arbutus and tree heather), on the highest parts of the peninsula to low scrub on the rockiest areas with thinnest soil. The low scrub often grows on abandoned cultivation terraces (see Rackham 1983). Compared with other areas of the Argolid such as the higher portions of Mt. Didyma, the vegetation on Methana is tall and lush. It includes species such as arbutus, not found elsewhere in the higher areas of the Argolid, which indicate considerable water retention in the soil (Rackham 1983).

Oregano belongs to the class of undershrubs (*phrygana*), low-growing woody plants which, unlike the shrubs of *maquis*, are short-lived and unable to grow into trees. Oregano is adapted to a dry Mediterranean climate in various ways. The hairy leaves of oregano reduce water transpiration rates. Oregano and other members of the mint family propagate by root division as well as by seeds, thus increasing the survival of the species by reducing dependence on seeds cast on a sun-baked earth (Muenscher 1955:378-379). Rapid regrowth is another adaptation to aridity; as a result, cutting back or burning off low scrub such as oregano enhances its growth. For centuries farmers and herders have burned off fields and scrub to create grazing areas, thus exploiting the ability of certain plants to regenerate rapidly (Aschman 1973; Duisberg and Hay 1971; King 1966; Le Houerou 1972; for impact of humans on the Mediterranean landscape see Aschman 1973; Di Castri and Mooney 1973; Forbes and Koster

1976; Halstead 1989; Jameson et al. 1994; McKell et al. 1972; Polunin and Huxley 1965; Rackham 1983:322-327; Rossignol and Wandsnider 1992; van Andel and Sutton 1987). Guides to the cultivation of oregano as a pot herb or garden plant advise cutting back the oregano to within one inch of the growing center to produce denser bushier growth (Hylton 1974:526; McKell 1975:806).

On Methana, oregano grows in natural *phrygana* (undershrub). However, one finds the thickest growth of oregano in the shadow of terrace walls at the edges of vineyards, fallow, and recently abandoned fields because the soil in the cultivated fields is deeper and the cultivation and fertilization of crops also benefits "weeds" such as oregano (Clark 1976b). It is likely that oregano does well on Methana through its ability to colonize field edges and expand into them more quickly than other *phrygana* plants. But, as Methanites continue to abandon fields, oregano is not likely to persist long in this niche because it is rapidly crowded out by taller vegetation (Rackham 1983). Wild oregano is not as abundant on Methana as in the Central Peloponnesos and Northern Greece. Soil composition, rainfall, elevation and decreased agriculture and grazing probably all contribute to this difference.

Two of the four species of oregano found in Greece (*O. onites* L., *O. heracleoticum* L., *O. vulgare*, *O. dictamnus* L.) grow on Methana (Gennadius 1914:730-731). The most valuable species is *Origanum heracleoticum*, identified by Methanites as *psili rigani* (fine oregano). This type of oregano is low and nearly creeping, with small white flowers and hairy grey-green leaves on erect stems up to about one foot in height. It appears in the higher areas of Methana above 300 meters. It grows better in lighter, mixed clay and sand soils than it does in the heavier more predominantly clay soils that are best for wheat and non-irrigated vegetable gardens (Forbes 1982).

The second species of oregano on Methana is *Origanum onites* L. Bentham which Methanites call *hondri rigani* (bulky oregano). It is also called *rigani tou gaidharou* (donkey rigani) because donkeys like to eat it. This type of oregano has smaller, less hairy leaves and larger flower heads. Bulky oregano grows in the lower parts of the peninsula below roughly 300 meters and also appears to prefer lighter soil. In some mid-mountain areas, the two types of oregano overlap.

Smallholders in the highest villages on the peninsula have had the greatest access to *rigani* because their land holdings extend from the top of the mountain to sea level, including the ecozones for both fine and bulky oregano. People in a large village on the western side of the peninsula have had greater access to the bulky oregano and collect it most actively.

Harvesting Oregano

Methanites collect *rigani* in July when the flowers are beginning to open, when the essential oils that flavor herbs are at their best (Crookes 1948), and

before the chemical changes that accompany full maturation of the plant. In the *nomoi* of Samos, Lesbos, Rethimnon (Crete), Euboea, and Rodopis (Thrace), the governors have issued decrees specifying the earliest date that oregano can be harvested to assure that people do not collect it before it has flowered and dropped seeds. This action protects *rigani* from extinction.

Methanites usually cut fine *rigani* with a sharp knife (Figure 10.1), in contrast to chamomile which they pull up by the roots. Some people wanted to



Figure 10.1. A village woman cuts oregano at the edge of a mountain field.

be certain that the *rigani* would regenerate for next year's harvest. For others, collection by cutting merely saved wear on the hands and reduced the trimming required to prepare bunches for sale. In the past some people pulled up the bulky *rigani* by the roots to increase the weight because the truck merchant who purchased this type of oregano paid by the kilogram (2.2 pounds). Later on, some of the truck merchants purchased by the bundle rather than by weight.

The gathering of *rigani* was usually combined with agricultural activities. Only two women who were very active in the sale of herbs made special trips up the mountain exclusively to gather *rigani*. Frequently people collected it while watching the sheep and goats graze in fallow fields. *Rigani* gathering occasionally conflicted with agricultural tasks that demand labor at the same time of the year, such as the care of grapevines. For example, one day when a family was tying up the grape vines, one of the women set aside her work to gather *rigani* at the edges of the vineyard. Her husband complained because her gathering delayed completion of what he considered a more important task. She argued that she needed to collect the *rigani* because last year someone else had cut that *rigani* before she could gather it for sale.

In hand-carrying the *rigani*, loading it, and transporting it back to the village by mule, people took great care to avoid bruising the leaves which darkened them and reduced their value (Figure 10.2). They dried *rigani* in bundles in a dark clean place to preserve the green color. Other time-demanding activities in the marketing of *rigani* included bundling, trimming, transporting, and selling it in the street market. Some people stripped the *rigani* leaves off the branches, ground them and packaged them in plastic bags. While this packaging increased labor without increasing returns per kilogram harvested, it increased the likelihood of sales because ground *rigani* was lighter and easier to use. The preparation of *rigani* was done during leisure time rather than the hours when agricultural tasks occurred. Instead of sleeping after their noon or evening meal, a man and his wife, a woman and her daughters, sons or mother-in-law sat in the shade talking and preparing *rigani* and other items for the local street market. The season for marketing *rigani* in the street market was a relatively slack time in the agricultural cycle, falling between the heavy labor period of the grain harvest (June) and the grape harvest (late September).

Marketing Channels for Farm Produce and Wild Herbs

Roughly seventy years ago, oregano became a source of cash for Methanites who collected it on the hillsides and marketed it and other herbs in the local street market and to traders for resale in Athens to shops, industries and exporters. Methana has long been linked closely with Athens and Piraeus through marketing, migration, and tourism. Improvements in transportation by

sea and land, particularly since the 1950s, facilitated the marketing of agricultural produce from Methana to the plain of Trizinia, Argos, and Nauplion in the Argolid, as well as Methana and Athens/Piraeus.



Figure 10.2. A village woman carrying freshly harvested *rigani* down the mountain.

In the past, marketing was limited to cargo boats powered by sail and later by diesel motor. Since the Second World War, trucks traveling overland and on the ferryboat have steadily replaced the cargo boats in carrying most of the goods traded between Methana and Athens/Piraeus, as well as trade with Argos/Nauplion.

The two main channels used by Methanites to market *rigani* were bulk sales to truck merchants that pass through the villages buying and selling produce, and sales to individual tourists in the street market in the port town. Itinerant truck merchants were the most direct link with the wider market system. They passed through the farming villages buying large quantities of *rigani* by the bunch or by weight for resale in Athens to exporters, wholesalers, retailers and industry. Bulk sale of *rigani* to a truck merchant rather than to individuals in the local street market could reduce profits per kilo as much as 50 percent. However, the advantages included: immediate cash, no time required for marketing, and potential for sale of larger quantities.

Villagers said that there was no point in selling fine *rigani* by the kilogram because it weighed too little, compared with the bulky type; only sale by the bunch made sense. A local trader in one of the higher villages bought it by the bunch and marketed it by boat on the nearby island of Aegina. Sales to this merchant were attractive to people in the high villages because they paid a higher bus fare each time they attended the street market in the port town.

The daily summer *laiki agora* (public street market) in the port town of Methana is where most Methanites sold fine *rigani*, other herbs and small amounts of agricultural produce, noodles, and *trahana* (coarsely ground wheat cooked in milk and dried in the sun; see Figure 10.3). They also marketed these goods through shops and rooming houses in the port town. For example, smallholder proprietors who owned a rooming house sold wine, homemade noodles, *trahana*, and *rigani* to paying guests.

An option used for larger quantities of farm produce such as fresh peas and figs was to pay a trucker to transport it to the wholesale market in Piraeus where a wholesaler sold the goods for a fee (cf. Campbell 1968). In 1986, grated oregano sold for 50 drachma per 100 grams. Bunches of *rigani*, approximately 300 grams, sold for 50 drachma (130 drachma=\$1 U.S. in 1986). The villager had to wait for the wholesale agents to issue the profits for sales and too often the agent took more than his fair share. This channel was never used by Methanites for *rigani* and rarely for other produce because of its negative aspects.

Some Methanites sold goods directly to shops in Piraeus. For example, one family concluded that it was better to sell all of their almonds to a *zacharoplastion* (pastry shop) than to sell the almonds in small packages in the street market. There was also informal exchange of village produce gifts with relatives and friends in Athens who reciprocated with processed foods, meat, cash, and other consumer goods. Because Methana is very near Athens, these

gifts were usually carried directly by relatives during visits rather than by messengers as was the case with the distant islands such as Tinos (see Dubisch 1977). In modern times, truck farmers from the irrigated plain of Trizinia dominate the street market for herbs and other fresh produce, and the now-aging village residents of Methana only distribute oregano and other herbs as gifts for relatives and friends.

Growth of the Street Market in Methana

Around the turn of the century, a large, strong-minded woman in one of the villages gathered *rigani* and took milk and eggs to the port town to sell to people visiting Methana to take the sulfur baths for their health. She told the other women in the village to "sell things in the port to earn money to buy *sardelles*" (sardines), which referred more generally to canned, processed food and other purchased goods. The villagers made fun of her *rigani* sales. They said it was fine to earn money doing wage labor in the fields and collecting *rigani* for family cooking, but it was shameful (*einai dhropi*) to gather *rigani* on the hillsides and sell it. Ignoring their criticism, she continued selling her produce and herbs.

Slowly, other women started selling milk and eggs to earn cash to buy consumer goods and contribute to their children's higher education. They drove their goats down to the port town before dawn to milk them in the port town so the buyers could see that they had not added water to the milk. Milk was sold in the same way in Athens at that time. Later the government established rules that sellers should bring the milk in containers, not on the hoof. In the early days there was no market area in that part of town. People, mainly women, sold eggs and milk to tourists at the doors of their houses. In those days the port town consisted of one street along the sea. Today there are several streets running parallel to the first street and the port town has incorporated the village above it, including tourist rooms and restaurants.

Over the years a greater range of produce appeared in the port town market. Men sold melons and grapes, women continued to sell milk, eggs, and *rigani*. The rationale for this social division of sales in the street market was that men do most of the work on the grapevines and the dry gardens, so those crops are theirs. Women graze and milk the sheep and goats and care for the chickens, thus the milk and eggs belong to women. In the early days of this trade there were fewer tourists but prices of these items were relatively high because transportation was poor and it was more difficult for Athenians to get items such as olive oil and other fresh produce. With the growth of the Greek economy, particularly after World War II, road construction connecting the Plain of Trizinia to the port town meant increasing competition in the street market. Even in the days before the road some people came from the plain area to sell

goods in the port town market. The present intensively irrigated vegetable and fruit farming on the plain did not develop until after World War II.



Figure 10.3. A smallholder farmer sells *rigani* and small amounts of other produce in the street market of the port town on Methana.

In the 1950s the local government designated the third street above the sea side street as the public market place (Figure 10.3). The market operates daily

from early July through the end of October, following the opening and closing of the sulfur baths. Trucks roll in from the plain of Trizinia laden with melons, greens, eggplant, squashes, peaches, tomatoes, beans, and other irrigated crops. The local police collected a small fee from each person selling produce in the market and occasionally checked the market to make certain that each seller marked the prices on all the items. Anyone without posted prices was subject to a fine of 3000 drachma (about \$23, 1986 exchange rate).

Throughout the 1970s and 1980s, people from the villages on Methana sold smaller amounts of produce and more homemade noodles and *trahana* than the people who drove in from the plain. Starting in the 1980s the types of herbs gathered by villagers for sale in the market increased in response to requests by customers to provide particular types of herbs. Some of the other herbs sold include: *hamomili* (chamomile), *Matricaria chamomilla*; *korpidothorto* (rusty back fern), *Ceterach officinarum*; *thimari* (thyme), *Thymus vulgaris*; *thrumbi* (savory), *Satureia thymbra* L.; and *dhiosmo* (garden mint). *Faskomilo* (sage), *Salvia triloba*, was collected for sale by people on the nearby plain of Trizinia and by one woman from Methana on the island of Angistri, where her husband had relatives. Another woman planted wild sage (from seeds) in her garden for sale. In front of a Methanite sitting in the street market one often saw a single basket or crate of figs, grapes or pears, a pile of onions, a few braids of garlic, a few pieces of homemade soap, four bags of noodles, three bags of *trahana*, two or three bags of shelled almonds, and ten bundles of *rigani*. The production of noodles and *trahana* increased yearly. Many women said this was their greatest source of profit in the market. The profits from *rigani* were relatively small. Nevertheless, many of the Methana women who sold produce in the market also sold a little *rigani* as well. A few women sold a variety of herbs along with their produce. A few old widows sold herbs exclusively because they had no other produce to offer.

When the market began, the only option for transportation was mule or donkey on the narrow pathway that led to the port town. Even when the vehicle road was constructed in the late 1960s and 1970s most villagers took mules to the market early in the morning to avoid the cost of the bus ticket and waiting for the bus to return in the mid-afternoon. By the 1980s, with more cash available, most Methana villagers attend the market via the local bus or individually owned farm trucks.

People from Methana's villages stored unsold nonperishable produce with relatives who lived in the port town near the market. When the local bus was required by law to join the state bus cooperative, less produce was permitted on the bus, making it more difficult for people carrying produce to the market. However, increasing numbers of families owned their own trucks or had access to lifts from relatives or neighbors with trucks. Those who took the bus paid from 80-140 drachma (\$.37-\$.76) for the round trip journey, depending on the distance.

Social and Economic Effects of Marketing Herbs

Herb marketing was one very small means toward the objective of providing a better standard of living for one's children. Methanites express this goal in statements such as: "My child will not have to work the soil as I have done"; "My daughter will be a housewife not a farmer." People repeatedly emphasized what a hard life it was farming on the narrow rocky terraces of Methana.

Although herb marketing alone did not provide a better standard of living for children, it contributed to that end, particularly for families with little land. In the early days of the market, people used their profits to buy shoes, thread for weaving and scarves, and to contribute to land purchases. Today, money earned in the local street market pays for purchased foods, clothing, travel to visit children in Athens, and contributes to larger expenses such as building homes, and the purchase of mules, trucks, and land.

An example illustrating the importance of oregano and other herbs for the land-poor is the case of Dionysios, whose health was poor since he was a child. He had Parkinson's disease and could not do farm labor. Instead he ran a shop selling herbs. He married a woman from a land-poor family who brought little dowry with her marriage. She and her daughter gathered herbs for sale to tourists and tilled their meager land holdings.

A few other case examples will show the role oregano sales have played in the local economy. Froso, one of the most active market women and gatherers of *rigani*, came from a poor family with many children, as did her husband who came from another village. Because her six brothers went to Athens in their early teens seeking a better life, she and her husband were able to work her siblings' land and her mother's land. They supplemented this effort with herb gathering, resin tapping, and wage labor. Many people in the community criticized her for working so hard, literally dawn to nightfall. But through these efforts she and her husband managed to purchase an apartment in Piraeus for their only daughter and to pay for her schooling. In the street market in 1985, Froso earned roughly \$700. Out of that sum, *rigani* and other herbs provided roughly \$70 profit. Today Froso and her husband live in Piraeus near their married daughter and grandchild.

Athena was also active in the street market. When she had two sons just starting high school, she attended the market daily because it was the only source of cash for the family other than very limited sale of surplus crops. Athena sold a wide variety of produce, including *rigani*, in small amounts. Her greatest profits came from the sale of noodles and *trahana*. She said that she and her husband had to work hard until their sons finished their education and got jobs. Athena did not start marketing until about twenty years ago when her mother-in-law stopped doing so. In most stem households, at least one where the son brings his wife to live in his parents' house and raise children there

(Clark 1988), the younger woman waited until her mother-in-law no longer wanted to sell goods in the market before she began her sales.

Ula started going to the market one day when her mother sprained her ankle. Ula liked the market and continued going. She never sold *rigani* because the family had too much work on the irrigated vegetable garden at the time when people gathered it. Her father was very ill, so all her earnings went toward essentials such as repairing the plow and buying fertilizer. Later, after her father died and the household economy improved, she started using her earnings to buy her trousseau. She did not attend the market after she married a man on the plain of Trizinia because she had too much work on his flower farm and two small children to look after.

Iliana, whose family is land-poor, stopped selling goods in the street market after her husband started earning wages in the port town in the summer, her mother-in-law was bed-ridden, and her son left for work in Athens. She had to perform all the domestic chores, take the sheep to graze, and care for her mother-in-law, rather than selling produce at the street market. Iliana used to sell *rigani* and small amounts of produce regularly in the street market, as did her mother-in-law before her.

In other parts of Greece, *rigani* is commonly harvested on public lands. On Methana, the land is all privately owned except a large stand of pine trees donated to a church and once rented for resin tapping (see Koster and Forbes 1978). When *rigani* became a source of cash rather than merely a seasoning for local use, many people stopped observing the traditional custom of allowing free access to the wild resources in their fields. In the 1980s, according to the law, a person could be taken to court for trespassing to gather *rigani*. However, most people said it was unlikely that anyone would go to court over *rigani*. Instead, villagers argued and held grudges against trespassers or stopped talking to them, and complained about their actions to others, as they did in other types of local disputes.

In the past, when only a few old ladies gathered *rigani* for a sale, there were no arguments over its collection. Later, there were disagreements all over the peninsula, particularly in the areas where the bulky *rigani* grew most abundantly and many families harvested large amounts for sale to truck merchants. Some families in these areas even fertilized the oregano to insure its growth. As the need for *rigani* as a cash source declined with increasing remittances from children, and as the supply of the herb increased due to the abandonment of terraced fields, disagreements about trespassing to collect *rigani* diminished.

Ecological Effects of Herb Marketing on Methana

At the edges of cultivated fields, oregano entered into a symbiotic relationship with humans. By clearing the fields of shrubs, inadvertently tilling and

fertilizing *rigani* at the edges of fields, and cutting it back during collection, villagers were able to profit from and enhance the growth of this herb.

Another example of the benign effects of collection of wild plant resources exists in Florida and Georgia in the United States. "Deer's tongue," *Trilipsia odoratissima*, used to flavor tobacco, yields over three million pounds of leaves yearly. Ecologists maintain that harvesting "deer's tongue" does not threaten its survival because the root system is not disturbed and the plant is able to regenerate (Krochmal 1972).

However, *rigani* is diminishing on Methana's mountainsides. Some Methanites blame this decline on the use of weed killer on fields in recent years. Others say that too many people have harvested it for sale. Still others say that the abandonment of cultivated terraces and growth of taller scrub is to blame for the decrease of *rigani* on Methana. It is also possible that the decline in numbers of sheep and goats grazed on the mountain shrub has had a similar effect on *rigani's* chances of survival in competition with taller species. Although donkeys do eat oregano, sheep and goats do not. There has also been a reduction in the amount of brush cut as firewood due to increased pruning of crop trees and decreased bread baking.

Discussing *rigani* collection and marketing in the Peloponnesos and Crete, Anasi noted that harvesting the whole plant by the roots for sale by weight, leaving no flowers to drop seeds, was threatening the future of *rigani* (Anasi 1978:213). In other mountainous areas of Greece, such as the Pindos where *rigani* grows more abundantly than on Methana, and where it grows in high areas used only for grazing, not for agriculture, these problems are less likely to threaten the existence of the herb. Like burning off and cutting back, grazing appears to enhance the survival of *rigani* (Rackham 1983).

In other areas of Greece, particularly North Central Greece, some farmers are cultivating *tsai tou vounou* (mountain tea, similar in flavor to sage tea) and oregano. The Greek Ministry of Agriculture provides interested farmers with booklets on *rigani* cultivation. The success of "wild" herb cultivation efforts depends on careful selection of species that are best adapted to particular environments and most productive in terms of the labor and chemicals required for their cultivation. Essential to the success of such projects is the organization of an efficient system of propagation, tillage, harvesting, and marketing to bring adequate returns to the farmer as well as providing a high quality product to satisfy the customer (Crooks 1948; Jones and Barclay 1972; Krochmal 1972; Le Houerou 1972).

The Future of Oregano Marketing

One of the most important factors affecting the future of *rigani* cultivation, harvesting, and marketing is its price on the world market and the return to the

farmer. From 1979-1981 the Greek government offered farmers a subsidy for growing oregano in order to stimulate production to meet international demands. Earlier, farmers themselves recognized the growing demand for *rigani* and requested information on its cultivation. After 1981 the demand for Greek oregano decreased because cheaper oregano entered the market from countries with a lower wage scale than Greece. With fewer returns, some farmers abandoned or reduced *rigani* cultivation. For example, in *Nomos Rodopis* in Thrace, farmers cultivated 300 *stremmata* (about 75 acres) of *rigani* in 1983 and 1984, but only 50 *stremmata* (about 11.25 acres) in 1985 because the price declined. In the whole of Greece 1,569 *stremmata* were cultivated in *rigani* in 1984 and only 719 *stremmata* in 1985 (Greek Ministry of Agriculture 1986). *Rigani* is unlikely to disappear from the marketplace in Greece as a whole because domestic and international demand is too great. Many consumers in Greece and worldwide are convinced that cultivated herbs can never be as flavorful as the wild ones and prefer to pay higher prices for wild products. Research is ongoing at the Center for Agricultural Research in Northern Greece (Thessaloniki) to develop new varieties of oregano for the international market.

Because economic growth in Methana and the Argolid region is providing more employment in building construction, tourism, and intensive fruit, flower and vegetable farming, it is likely that even fewer women will market *rigani* in the street market in the future. Fewer people are willing to accept the low status associated with tending herds of sheep and goats, tilling the soil and gathering wild plants. Instead they want government positions or skilled trades for their children (Clark 1988; Koster 1974, 1975; Bauxevanis 1972; Campbell and Sherrard 1968; Sutton 1983)

In any event, it is likely that *rigani* will continue to grow and be harvested on Methana's mountainsides. Families on Methana probably will continue to gather *rigani* for household use and as gifts for relatives in the city. The intensification of *rigani* gathering and marketing on Methana contributed, in a small way, to meeting domestic and international demand for it. More significantly, Methanites, working at the margins of the agricultural system and through informal entrepreneurial activities, found that *rigani* marketing offered a source of cash for those with little but labor to invest. Thus this strategy allowed people to transform another uncultivated part of the landscape into a valued resource (see Clark 1976a, 1976b, 1976c, 1977; Forbes, this volume).

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WORKING THINGS OUT: ON EXAMINING THE RELATIONSHIPS BETWEEN AGRICULTURAL PRACTICE AND SOCIAL RULES IN ANCIENT KORINTHOS, GREECE

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Introduction

This paper is based upon fieldwork that I am carrying out in Ancient Korinthos, a predominantly agricultural village located, quite literally, astride the ruins of the ancient Roman city of Korinthos. My own ethnographic interests in village agricultural production are part of a multidisciplinary research project designed to examine the long-term processes of social change within the region known as the Korinthia, of which this village is a part. The research in Ancient Korinthos is still in its initial stages. The work thus far has yielded complete census data, a series of interviews with local farmers regarding their production strategies and a parcel-by-parcel survey of agricultural land-use within the community (Shutes 1992, 1994, 1996). Eventually, it is my hope to be able to understand the complex interplay between the environment, production strategies and changing social relationships within the village and to then extend that analysis to other agricultural groups within the region. Much of my previous research has been concerned with similar problems in rural southwestern Ireland (Shutes 1987, 1989, 1991, 1993).

In the present work I am concerned with the relationship between Greek agricultural practices and the shared rules which govern and regulate their social interactions (hereafter referred to simply as "social rules"), particularly the relationship between the fragmentation of agricultural holdings and the social rules governing dowry and inheritance. Greek farmers practice a system of daughters' dowry and equal inheritance that leads to the fragmentation of farm holdings and, hence, a significant decrease in overall agricultural potential and productivity. In the context of modern competition, some suggest that this

agricultural practice and others affected by similar social rules can produce drastic consequences for the Greek economy and for its rural population, and so a precise understanding of these relationships seems warranted. And yet, as we shall see, despite intensive discussion by ethnographers and other interested scholars over a number of years, there is little or no agreement about how we are to approach this problem. In an attempt to focus the discussion about these relationships I shall: (1) categorize and attempt to evaluate the range of explanations that have been offered; (2) suggest a modified version of one of the explanations so as to increase its utility in modern ethnographic situations; and (3) examine the efficacy of this modified version in light of the data drawn from my current fieldwork in Ancient Korinthos.

Approaches to Farm Fragmentation and Dowry/Inheritance Practices

My analysis of the land-use and land tenure data for the village of Ancient Korinthos reveals a distinct pattern of fragmented individual holdings, so that many farmers must travel significant distances between numerous isolated parcels in order to work their farms. The farmers themselves attribute this condition to their system of dowry and inheritance, and they point to their obligations to provide for their children as the primary motivating factor.

Such findings are not unique to Ancient Korinthos, since the association between fragmented holdings and specific patterns of dowry and inheritance has been widely reported for rural Greece (Campbell 1964, 1976; Friedl 1962; Forbes 1976, 1982, 1989; Gallant 1989; Halstead 1984, 1987, 1990; Halstead and Jones 1989; Lambiri 1965; McNall 1974, 1976; Sanders 1962; Thompson 1963). Despite this breadth of discussion, however, there appears to be a strong diversity of opinion about how this association is to be understood and interpreted. Although each explanation varies in setting and context, I have found it useful to classify them into three general groupings, which I shall refer to as the Traditionalist, the Developmentalist, and the Risk-Management approaches, respectively. Let us examine the relative strengths and weaknesses of each approach.

Traditionalist Approaches

Among the earliest ethnographic explanations, Traditionalist approaches are those that give priority in analysis to a set of traditional values associated with dowry and inheritance, which creates in the people that hold them an inability or reticence to change such practices despite the fact that they have a clearly negative impact upon agricultural productivity through land

fragmentation (see, for example: Campbell 1964, 1976; Friedl 1962; McNall 1974, 1976; Lambiri 1965; Sanders 1962). In other words, the retention of traditional values prevents rural Greeks from fully participating in modern agricultural practices, which contributes to the marginalization of their communities and, eventually, to the underdevelopment of Greece as a nation. Often some broader pattern of social rules, such as "amoral familism" or the "image of the limited good," is invoked in these kinds of approaches in order to explain the retention of these dowry/inheritance practices, as in the following from Campbell:

In these struggles men tend to think of their local world as one of fixed and limited resources. Each family resents the land held by other families and envies them any success that exceeds its own. This encourages, indeed requires, a general attitude of wary and intense distrust of all persons who do not live in the same household. This distrust may be mitigated by ties of kinship and neighborhood within a limited circle of families where practical cooperation is possible. But it is never wholly absent. Moreover the intensity of these competitive attitudes is maintained by the relative absence of great inequalities of wealth. This is partly the consequence of the customary institutions of daughters' dowry and equal inheritance rights for sons and also the absence since 1927 of large estates worked by agricultural laborers. The same institutions have contributed to the fragmentation of farm holdings. (1976: 21; also see McNall 1976: 35)

One obvious strength of these types of approaches is that they examine the problem from a local level, and can therefore be sensitive to the variations in behavior that occur and to the exceptions to the overall pattern. They also emphasize the strong value-orientation that underlies human action. But these potential strengths are overshadowed, I believe, by three equally obvious weaknesses. First, such approaches portray individuals as being totally determined by a complex of traditional community values that they seem unable to alter, even when it means their own economic demise. This deterministic and passive view of individuals is a product of the earlier functionalist views of peasantry (Popkin 1979; Sutton 1997), and more recent Greek ethnography has clearly demonstrated the dynamic nature of individuals in negotiating a wide range of economic, political, and social rule domains (see, for example: Bennett 1988; Costa 1988; Cowan 1990; Danforth 1989; Dubisch 1986; Hart 1992; Herzfeld 1985, 1987, 1991; Karakasidou 1992; Panourgia 1994; Seremetakis 1991, 1993a, 1993b).

Second, the Traditionalist approaches pay inadequate attention to economic measurement. Proponents are so concerned with the identification of community values and their effect upon farming practice that they rarely empirically examine the crucial economic variables that are clearly at work in such places, namely, the impact of the external market upon the strategies employed by local farmers and the measurement of the actual productivity of

those strategies. Seldom do such approaches actually measure variability in local farm productivity or view farming from a strategic perspective (see, for example: Breathnach and Cawley 1986; Curtin and Wilson 1989; Long 1984, 1986; Popkin 1979; Shutes 1991, 1994).

Third, there is a strain of ahistoricism in these approaches that is the product of viewing Greek rural life as strongly traditional. Many Traditionalist proponents view change as the sole product of the forces of modernization, and give the impression that the behaviors that they describe had a long and uninterrupted history prior to these modern disruptions. More recent ethnoarchaeological and agricultural historical research has clearly demonstrated that such is not the case, and that, if anything, the history of rural Greece has been marked by more or less continuous political, economic, and environmental upheavals to which local rural populations have had to adjust (Chang 1994; Forbes 1993; Fotiadis 1995; Halstead 1990; Sutton 1988, 1991, 1994).

Developmental Approaches

More often utilized by regional, national, and international development specialists than by anthropologists, Developmental approaches assume that, given the proper technological, economic, and governmental incentives, land fragmentation can be eliminated, and the older patterns of dowry and inheritance will wither away to be replaced by more compatible social systems. It is not that such approaches view what they consider archaic social rules as non-problematic, but rather that they constitute secondary problems resolvable, eventually, through sound technological, economic, and political management of agricultural land (Kayser 1976; Thompson 1963; Weintraub and Shapira 1975). To a large extent, they believe that the transformational powers of economic and technological development are sufficient to overcome any form of social resistance. Consider the following comments from Kayser, for example:

So it can be said, with no fear of serious denial, that in spite of certain remnants of archaism, whose full importance must be appreciated, underdeveloped Greece has been admitted, on an equal footing, into the society of international bourgeois countries; in the whole, Greece is undeniably integrated...But this unification, evidently, cannot go without the disintegration of the local subsystems, which in a country as fragmented and underdeveloped as Greece, have played, for a very long time, so essential a part in the organization of space. Destroyed is the local social system based upon patronage and social disparities, destroyed, the local economy based on complementary activities and barter (exchange of commodities), destroyed too, the local folk-culture. (1976: 11-12)

The strength of these kind of approaches is that they pay close attention to the measurement of economic variables and to the factors that integrate local groups into larger regional, national, and international markets. Once again, however, the weaknesses with the Developmental approaches outweigh their strengths. First, these approaches also assume a passive, non-strategic, role on the part of Greek farmers. In this case, they are seen to reject automatically any existing social rules that are not in keeping with the emerging capitalist and market economy, regardless of whether or not some of the older rules may still prove efficacious in the maintenance of certain local relationships. Second, the approaches are almost exclusively technological and economic in their emphasis and pay little or no attention to existing patterns of social interaction at the local level. By assuming a homogeneous transformation to mainstream class-oriented values, they virtually ignore the ways in which capital and market intrusions may be modified and negotiated according to local social rules in Greek farming groups (Mouzelis 1978; also see Goodman and Redclift 1982, for a similar critique in a wider context). And third, because they ignore local social values and patterns of social interaction, Developmental approaches tend to be strongly ahistoric, assuming that older patterns of behavior have existed unchanged for long periods of time, succumbing only recently to the forces of modernization. As has already been demonstrated, the history of rural Greece does not support such assumptions.

Risk-Management Approaches

The third and most recent set of approaches, Risk-Management or Risk-Buffering, view various agricultural practices, such as farm fragmentation, overproduction of staples, investment in consumer durables, and others, as part of a hierarchy of strategies employed by Greek farmers to minimize or buffer the risks of arid-land farming under highly variable conditions. They also see accompanying social practices, such as daughters' dowry, equal inheritance, and the behaviors associated with 'amoral familism' and the 'image of the limited good' as the cultural mechanisms within which such useful strategies are embedded (see Forbes 1976, 1982, 1989; Gallant 1989; Halstead 1984, 1987, 1990; Halstead and Jones 1989; Halstead and O'Shea 1989). They view the fragmentation of agricultural holdings as a risk-management mechanism, reinforced and maintained by specific cultural norms of dowry and inheritance, which insures that all farmers gain access to some part of each of the highly variable local land types typical of rural Greece, and thereby increase their options for production (Forbes 1976, 1982, 1989). Thus, for the Risk-Management approaches there is no contradiction between existing social values and the hard economic realities of farming the Greek landscape, as is the case for the other two types of approaches examined. According to Halstead:

The application of practical reasoning to such respected cultural rules will doubtless offend in some quarters, but it is not intended to deny the ideological dimension to relations between households. On the contrary, it is argued that the embedding of risk-buffering mechanisms in other aspects of culture is critical to their maintenance...Risk and risk buffering are of central importance to the study of rural society in Greece. First, Greek farmers face a formidable array of natural and cultural hazards and sometimes the severity or frequency of these hazards poses a real threat to survival. Consideration of risk buffering is critical, therefore, to an understanding of rural economy in Greece. Secondly, these buffering mechanisms are highly diverse and often deeply embedded in other aspects of culture, so their investigation offers a wide range of insights into rural society. (1990: 160-161)

Risk-Management approaches have many advantages over the other two types. First, by viewing Greek farmers as active strategists in the management of their land, labor, and capital under highly variable environmental conditions, they offer a solution to the problem of the apparent contradiction between social practices and economic efficiency that plagued the other two approaches. In point of fact, they see no contradiction at all. The particular social practices associated with dowry and inheritance act as mechanisms which promote necessary access to variable local soils through land fragmentation (Forbes 1976), and the larger value issues surrounding "amoral familism" and the "limited good" are seen as complementary to an economic strategy where "a keen and jealous interest in one's neighbors' economic activities represents the intelligence gathering essential to household survival" (Halstead 1990:158-159).

Second, by suggesting a hierarchy of risk-management, from lower-risk local strategies such as farm fragmentation and overproduction to higher-risk strategies involving cash cropping for national and international markets (Halstead and O'Shea 1989:1-7), these approaches both clearly specify the conditions under which Greek farmers have decided to interact economically with the larger world around them in the recent past, and examine the outcomes of those decisions. They also strongly suggest that lower-risk strategies will alter with greater stability in the national and international marketplace (Halstead 1990:160), which would also alter, presumably, the social rules within which such strategies are imbedded. Finally, careful historical analysis of the numerous strategic adjustments made by Greek farmers in the past permits such approaches to empirically reject any notion that change in rural Greece is only a relatively recent product of modernization (Gallant 1989).

One major weakness of the Risk-Management approaches is that they are directed more to the past than to the future of rural Greece. For example, Halstead (1990:160), while suggesting that "recent buffering behaviour is clearly influenced by the interaction of Greek farmers with an international market economy," does not pursue any of these influences in detail. Indeed, he goes on to state that "recent risk-buffering behavior may be of greatest

significance...for the investigation of long-term social and economic change in the small-scale societies of the distant past" (1990: 160).

Most of the research on risk-management has been carried out by individuals with a special interest in ethnoarchaeology, ancient history, or prehistory. Their concerns are in linking the distant past with the recent past, and so they gravitate towards examining rural agricultural strategies in Greece that more closely resemble those of the distant past, that is, those that have been predominantly small-scale and subsistence-oriented in the recent past. Their analysis strongly links Greek farmers' strategic considerations of ecology, politics, and economics with their value-oriented social practices of the recent past, but does not extend that analysis to include many farmers that are now permanently linked to cash-cropping and a burgeoning international marketplace and polity. But, then, such concerns are not within the parameters of their research interests.

Another weakness, which is directly related to the first, is that Risk-Management approaches fail to specify how the value structures which govern various social practices such as dowry and inheritance come to be changed when risk-buffering mechanisms are altered by improvement in environmental, economic, or political conditions. According to Halstead, "the risk-buffering role of such (cultural) practices can only be evaluated, however, in terms of their *effects*—their success in avoiding or mitigating loss—and not in terms of the motivations for their existence" (1990:159). Although proponents of the Risk-Management approach clearly recognize the active, decision-making role that humans play in interacting with their environmental systems through agricultural practice, they just as clearly fail to do so when considering their systems of social rules. This omission leads to a subtle brand of ecological determinism if one attempts to extend their analysis, unaltered, into the future rather than the past, for only the agricultural practice component, the one specifying ecological relationships, is viewed as dynamic and capable of producing change, whereas the social component, the one specifying the cultural relationships, is that which is wholly determined.

Discussion and Revision of the Approaches

Having reviewed the strengths and weaknesses of the various approaches, it seems clear that we must first broaden the base of the discussion if we are to come to an understanding of the real issues. Rather than limiting our inquiry to the manner in which dowry/inheritance rules are related to farm fragmentation in Greece, perhaps the more crucial general question should be: How shall an ethnographer working in present-day rural Greece understand the vital relationships that exist between agricultural practice and social rules, given an environment of rapid political and economic change? I suggest this because in

each of the approaches reviewed the question of dowry/inheritance and farm fragmentation are always viewed from the broader perspective of practice versus rules. Certainly if we can understand the general relationship between social rules and agricultural practice more precisely, specific components of that process should also become less ambiguous.

While it is apparent that no single approach provides a wholly adequate answer to such a question, proponents of what I have labeled the Traditionalist and Developmental approaches will pardon me for viewing the Risk-Management approach as having the greatest potential in this regard. For each of the former two are ahistoric, and each contains an unacceptable version of determinism at the heart of their explanations (sociocultural and techno-economic, respectively). Thus each portrays the individual farmer as being only the passive recipient and acceptor of whichever brand of determinism they emphasize. They are at polar opposites with respect to the variables in question: for the Traditionalists, social rules basically determine agricultural practice; for the Developmentalists, agricultural practice basically determines social rules; and neither pays much empirical attention to the primary variable(s) of the other. And yet, in a paradoxical fashion, each argument has been used to support its opposite. For example, it is not uncommon in the Developmental literature to find the researcher explaining Greece's underdeveloped agricultural economy as being due, at least in part, to the stubborn refusal of the Greek peasants to give up their archaic system of traditional social rules, while Traditionalist approaches often criticize economic development projects for their lack of sensitivity to those traditional rules (the work of Thompson [1963] and McNall [1974, 1976] are good examples of this kind of paradoxical support, and makes their work difficult to classify in my general schema).

As we have seen above, the Risk-Management approaches offer a viable solution to this bipolar dilemma. In viewing Greek farmers as active strategists in the management of their land, labor, and capital under highly variable environmental, economic, and political conditions, they demonstrate with clarity and precision, for the recent past at least, how those strategies are embedded within a complex of social rules, including dowry and inheritance practices, which complement them. They also strongly suggest that the alleviation of the higher-level risks involved in commodity production for cash will have an impact upon those strategies and, hence, upon social rules as well, although they do not specify how this might operate.

This lack of specificity may not constitute much of a problem for those with an interest in the distant past, but, for the ethnographer, being unable to specify how changes in agricultural strategies specifically affect the rules which govern social interaction amounts to a subtle form of ecological determinism, wherein we must automatically assume that, whatever the nature of the changes in strategies, the resulting social rules will "adapt" to them. This is insufficient and, in a very real sense, it violates the whole notion, so strongly supported by

other elements of the Risk-Management approaches, that individuals are active participants and decision-makers who regularly negotiate the boundaries of their lives and livelihoods.

I would like to suggest a modified version of the Risk-Management approaches that may serve to eliminate this underlying problem of ecological determinism for ethnographers and yet maintain the basic perspective that they offer. The ethnographic approach involves three factors that can be summarized as follows:

(1) It must incorporate a history of the various forms of capital accumulation introduced into the local rural group, and a careful documentation of the changes in production, and subsequent changes in social relations, that such introductions produced. Given the diverse and differentiated nature of this process, it is quite likely that any local group will exhibit a mixture of production strategies at any given point in time, governed by various forms of capital accumulation, and not simply exhibit a single "modern" or "traditional" pattern.

(2) The core of the historical analysis must be "strategic", that is, it must focus upon the active role that farmers play in making production decisions, and the economic, political and ecological factors that shape such decisions through time.

(3) Finally, given the mix of production strategies, it is also likely that the existing rules regulating social interaction will reflect such a mix of strategies, an on-going "rules-negotiation," if you will. The approach must allow the investigator to identify the appropriate social rules that govern production decisions at any point in time, and the conditions under which such rules are negotiable.

Following the above guidelines, we should now be able to make better sense of the kinds of changes that are affecting Greek rural farmers, such as those in Ancient Korinthos. I shall begin with a brief overview of the pertinent data from that place.

The Revised Approach in Ancient Korinthos

In 1879 there were 606 residents recorded as living in Ancient Korinthos. This had increased to 1,724 by 1980, the last date for which census totals are presently available, and local experts place the number today in excess of 2,000 people. Much of this growth is the result of in-migration from other less prosperous regions within the Peloponnesos as well as an influx of people leaving the over-crowded conditions around Athens, only 80 km to the northeast of Ancient Korinthos. The situation has become even more complex as of late with the entrance of both legal and illegal Albanian refugees, who bring few or no resources with them (Shutes 1994).

Many of the recent migrants have sought employment opportunities on local farms, in the oil refineries located on the Saronic Gulf, or in the numerous new industries and commercial enterprises that have arisen in the thriving market town of New Korinthos, which is only fifteen minutes by public transport from Ancient Korinthos. The net result of all of this has been an increasing competition for land and labor resources within Ancient Korinthos between the farmers, who are still the predominant group and the new migrants who are seeking land for housing and/or other commercial enterprises. Indeed, the competition moves both ways, as farmers with small holdings seek permanent non-farm employment to augment their farm incomes. As one young farmer told me: "the ideal situation is to have employment that isn't too physically tiring, and to also be a farmer" (from fieldnotes July 1992).

The analysis of agricultural production within Ancient Korinthos also reveals multiple changes over the past 100 years, as many farmers have moved away from the older pattern involving only olives, cereal grains (wheat and barley), grapes and sheep/goat complexes into the more volatile and lucrative markets of oranges, lemons, apricots, tomatoes and other fresh vegetable products. This move has been spurred in part by the entrance of Greece into the European Union, but also by the developing local markets in New Korinthos and Athens. Such farming is more risky and involves a more comprehensive knowledge of the local, national and international markets. It also entails a much higher investment in technology, as is witnessed by the fact that the vast number of parcels which contain such products require continuous irrigation, fertilization, and pest and weed control. These processes have yet to work themselves out fully, but clearly they have the potential to transform many existing social and economic relationships.

From an historical perspective, there is every indication that such rapid adjustment to changing markets is not new to the farmers of Ancient Korinthos, who have always been blessed and cursed by their ideal geographic location for commerce, as is indicated by their eighteenth century shift away from currants to table grapes, and the more recent shift from apricots to oranges when market conditions changed. The data thus far reveal little evidence to support the notion that farmers in this community have only recently been forced to abandon their "traditional" farming practices in response to outside market pressures. Rather it supports the idea that farmers have been making market decisions and readjusting their production strategies on a continuous basis for a long period of time (Shutes 1994). The difference, with this particular round of changes, is the degree of permanence and stability of those markets, both locally, nationally, and within the EU, which serves to greatly reduce the risk of commodity production for the market.

Interviews carried out with local farmers in Ancient Korinthos have yielded the following list of general constraints, or conditions, that have recently had an impact upon their production decisions. I have tried to identify a wide range of

environmental, economic and political factors in the production of this list, although it should be emphasized that all such work is still in a preliminary stage and may be subject to expansion or revision with the acquisition of future data. It should serve, however, as an example of the approach I am suggesting.

(1) Increased Multi-Cropping

As mentioned above, farmers now have greater options for what they produce, and have moved away from the older pattern involving almost exclusive dependence upon some combination of olives, cereal grains (wheat and barley), grapes, and sheep/goat complexes into the more lucrative markets for oranges, lemons, apricots, tomatoes and other fresh vegetable products. This process demands a greater knowledge base on the part of the farmer with regard to the requirements of soil types, irrigation and fertilization, technology, and marketing and transportation techniques, but they feel that they cannot afford to be without such knowledge, even if they do not immediately move into these new areas of production, since today's marketplace demands much greater flexibility, and more rapid decision-making.

(2) Disconnected Versus Connected Labor Orientation

Farmers whose former strategy rewarded more disconnected and familistic behaviors in the recruitment and organization of labor, and who could also draw from a surplus of seasonal labor from the more marginal parts of the Peloponnesos, are now experiencing a labor shortage, as they are forced to compete with local industries which offer far better wages. They believe that they may have to significantly increase their labor cooperation with other local farmers to accommodate the increased variety of crop production that makes more specialized commodity production profitable. Hence, they find themselves more connected and interdependent at the local level.

(3) Specialized Versus Generalized Capital Expenditure

Previously, farm households were not required to invest heavily in any one set of specialized production technologies, and depended upon a very general tool kit to sustain their limited number of production items. They now find that this is changing rapidly, as an increasing variety of specialized crops demands some investment in more specialized equipment to carry out efficient, labor-saving production techniques.

(4) Underutilization Versus Overutilization of Land

In the past, political and economic instability and depressed and/or unreliable agricultural markets led to significant abandonment of small parcels of land as unsuccessful farmers migrated or emigrated to seek a better life. Farmers who were planning expansions of their enterprises, then, found it less expensive to lease or purchase the additional parcels that they needed. Today, as we have already seen, farmers, who now need every available bit of land to accommodate their multiple-commodity strategies, find themselves involved in intensive and expensive competition for land with other farmers and other kinds of enterprises, such as the luxury housing market and expanding industries

along the Saronic gulf. Further, the pressure to overutilize existing land resources places a severe burden on the local ecology, particularly upon available water resources, since the more lucrative new crops demand much higher levels of irrigation and fertilization. Future availability of water and the degradation of the soil are, in fact, the universal worries among all of the farmers interviewed.

(5) International Versus Local/Regional Markets

For the farmers of Ancient Korinthos, the expanding local and regional markets for highly perishable fresh fruit and vegetables can often prove more profitable than bulk sales of such commodities via the European Union (EU). This is particularly true when the EU subsidizes certain varieties of produce that do not grow well under local conditions, or where the produce reflects local/regional tastes only. Farmers, therefore, are wary of the highly regulated pricing systems and internationally standardized markets of the EU, and are more concerned about developing stronger local and regional markets for their produce. They also recognize, however, that crop failure of EU-subsidized varieties can receive compensation, and is thus less risky.

(6) Federation Versus Inter-Government Political Views

With respect to the governmental status of the EU, farmers in Ancient Korinthos are more often in favor of an extended period of economic integration with power remaining in the hands of individual member-states acting through inter-governmental councils. This belief is more consistent with their concern for having greater freedom to explore and exploit local and regional markets with less central control over their production decisions.

Any new production decision taken by local farmers that falls within these constraints can be considered relatively low-risk since there is at least some level of local practical experience and shared knowledge and opinions to guide such a decision. Of course, the closer that a decision comes to the boundaries the greater the increase in risk. For example, a decision to pursue a pure subsistence-oriented strategy would be at one extreme, while a decision to devote all of your resources to the production of a totally unfamiliar crop complex would be at the other, and both would constitute high-risk strategies.

Given the above constraints upon present agricultural practice, it is possible to conceptualize the farmers of Ancient Korinthos as "negotiating" within two possible sets of social rules that I have labeled *Parochial* and *Cosmopolitan*.

By *Parochial* rules I mean social constraints that lead individuals to define their role as a farmer/producer *primarily* in terms of locally acceptable moral and ethical ideals concerning the manner in which a "good person/good neighbor" should behave towards other locals. *Parochial* rules should predominate in situations where farmers are strongly dependent upon each other's labor and assistance in order to accomplish their own production goals, but they obviously exist at some level in all rural groups (Halstead 1990: 159), even if only activated in the form of individual discretion.

By *Cosmopolitan* rules I mean social constraints that lead individuals to define their role as a farmer/producer *primarily* in terms of pragmatic standards that are typically couched in the practical realities of being a "smart farmer/wise provider" and the need to insure the success of one's own enterprise and family production unit. *Cosmopolitan* rules should predominate where little or no labor dependency between local farms exists as a prerequisite for successful individual production. *Cosmopolitan* rules can be viewed as the presently more dominant set of social rules for farmers in Ancient Korinthos, given their background of dowry and inheritance patterns and strong familistic orientation.

When I say, for example, that the local farmers are moving their negotiations away from *Parochial* and towards *Cosmopolitan* rules, I mean the conditions are such that, when they have arrived at a decision about a change in production strategy that requires no dependence upon other locals, or a significant decrease in such dependence, they will seek to justify their decision by reference to pragmatic standards for the "smart farmer/wise provider." Conversely, when I say that farmers are moving their negotiations away from *Cosmopolitan* and towards *Parochial* rules, I mean that the conditions are such that, when they have arrived at a decision about a change in production strategy that requires an increase in their interdependence with other group members, they will seek to justify their decision by reference to local ideals for the "good person/good neighbor."

My research to date in Ancient Korinthos has yielded numerous examples of moves away from *Cosmopolitan* and towards *Parochial* rules, but space requirements limit me to the following representative case:

Two farmers, each of whom own small holdings totaling approximately fifteen *stremata* (slightly more than three acres), happen to have their single best fields of approximately one-half acre contiguous to each other. Their other holdings are scattered throughout the area and located on predominantly hilly and dry soil suitable only for olive cultivation. Each depends upon this larger field, therefore, as a source of stronger cash production, and each farmer had initially planted a variety of oranges that were subsidized by the European Union (EU) in order to minimize the risk. But the subsidized varieties did not grow well in Greece and demanded more and more investment in fertilizer and irrigation in order to maintain a stable crop production. Many orange growers with larger holdings had already shifted their production to other non-subsidized varieties of fruit and relied upon brokers to market their produce outside of the EU. This option was also available to these two farmers, but their production scale was so small that they could not risk the highly variable yearly price that they might receive from outside brokers. Both fields are suitable for growing tomatoes, zucchinis and other fresh produce for the vibrant local markets in nearby towns and in Athens, some 60 miles to the northeast, but the yield from either field alone would not justify the cost of intensified and timely labor and additional equipment that such strategies demand. They decided to merge their two fields and to mutually share the

labor and costs of vegetable and tomato production and marketing. They broke even during the first year of operation, but now earn more income from their combined activities than either would have earned from their separate production of the ill-growing subsidized oranges, and each is now more empowered in terms of their dealings with large and small food markets. Their families, however, who have inheritance rights in the fields, are worried about how this land can be fairly transmitted in the future, and there is always some grumbling and distrust about the amount of labor that one family invests versus the other. The farmers themselves, however, say that these are all things that must work themselves out, and that, after all, what can they do? They must look to more cooperative means to market crops or their families will have nothing to inherit at all. Later on, in private conversations about the arrangement, each farmer ends up talking about the relative neediness of the other and not their own economic needs: how the other is a hard-working and reliable person and has so many children for whom to provide, and so on. Neither is certain that the arrangement will last very long, but both are satisfied, for the present, that they have done the right thing. (From fieldnotes: Summer 1994; also see Shutes [1996] for a comparison between Irish and Greek farmers)

Here a decision about an agricultural practice involved conditions that demanded a greater level of cooperation between two farmers in order for each to increase his returns, and the decision itself was relatively low-risk since it was within the constraint parameters we have identified above. In this case it was the more dominant pattern of *Cosmopolitan* social rules that had to be negotiated, since the shared-fields arrangement aroused doubts about "proper" inheritance procedures and mistrust with regard to a neighbor's motivations among other members of both families involved.

The farmers resolved this problem by publicly portraying themselves as "smart farmers/wise providers" in their references to the immediacy of the economic situation, even though the results of their decision were in obvious and direct contradiction to the expectations of *Cosmopolitan* social rules. They also deferred action on the inheritance problem for an indefinite period by offering the notion that 'these are all things that must work themselves out', thus leaving room for a possible alteration of the current decision at some later date. Privately, each seems to have justified his decision through reference to the greater economic neediness and trustworthy character of the other, and not their own economic needs. Thus, calling upon the "good person/good neighbor" quality of *Parochial* social rules, they explain their own decision as being principally motivated by concern for the well-being of a poorer neighbor. The majority of the examples recorded thus far in Ancient Korinthos involve very similar negotiating strategies.

As should be evidenced from the above, such negotiations must be viewed as continuous and complex processes. Although one set of social rules may predominate at any given point in time, the possibility for rule negotiation and

the creation of new social rules is always present, as long as a variety of relatively low-risk production alternatives exist. Some production decisions may be governed by older rules and others by newer ones. Some are the result of creative compromise or invention, given a choice between difficult alternatives, as is probably the case with the farmers in our example.

Conclusions

It is not my intention to suggest that what I have offered above constitutes some kind of instant formula for understanding the relationship between agricultural practice and social rules in Ancient Korinthos. Quite the contrary; it only represents work-in-progress that is intended to focus the discussion about this issue. But even at these initial stages of my research, it has become obvious that agricultural practice and social rules are strongly interrelated processes, just as the Risk-Management research has suggested. One does not determine the other, and their relationship is complementary, not contradictory. There is also a distinct pattern to the manner in which they interact. Let me attempt to summarize the way I presently see that pattern as operating.

Environmental, economic and political factors determine the realistic limits to agricultural practice, and these limits are best viewed in terms of degrees of risk. These limits, in turn, determine the boundaries within which social rules can be negotiated. If the range of low-risk possibilities for agricultural practice is limited by such factors over a number of generations, then there is little room for, or purpose to, any substantial negotiation of social rules, which can explain the emergence of dominant patterns in such rules. Conversely, if the environmental, economic, and political factors permit an increasing range of low-risk possibilities for agricultural practice over a number of generations, then the dominant set of social rules will undergo continuous negotiation, until such time as the range of possibilities again becomes limited. The result is the emergence of a new dominant pattern of social rules which can accommodate the altered range of possibilities for agricultural practice. But, as is the case for the two farmers and their shared fields, the negotiations surrounding social rules are flexible and open-ended, always leaving room for the next potential round. And the old is always contained within the new, as long as the low-risk possibilities for agricultural practice, both old and new, continue to overlap.

If we now apply some of the general principles discussed above to the specific issue of dowry/inheritance and land fragmentation in Ancient Korinthos, I believe that we can arrive at a more satisfactory explanation for why such relationships emerged and what is likely to happen to them in the future. Political and economic instability over a number of generations, coupled with a highly variable and challenging environment, produced a limited number of low-risk possibilities for agricultural practice, principally rewarding those

practices that required little or no regular cooperation between farming neighbors. This resulted in the emergence of a dominant pattern of *Cosmopolitan* social rules, which reinforced and legitimized these practices. Land fragmentation is a crucial means by which the maximum number of individual farmers gain access to highly variable soil types, and the social rules surrounding daughters' dowry and inheritance reinforced and legitimized this practice. Although the opportunities to negotiate this and other *Cosmopolitan* social rules were usually minimal, brief periods of political and economic stability did produce a sufficient number of episodic, and often dramatic, local forays into the marketplace, which gave local farmers some experience with other alternatives to their restricted agricultural practices and kept the door open for potential rules-negotiations in the future.

It was not until the very recent past, however, that the changing environmental, political, and economic factors identified in the previous section combined to produce an enduring increase in the number of low-risk possibilities for agricultural practice within Ancient Korinthos. This particular combination of factors differentially rewards agricultural practices that demand ever more intensive cooperation on the part of farming neighbors. The result is that dowry/inheritance practices are on the negotiating table, as farmers move towards *Parochial* social rules which can reinforce and legitimize the consolidation of land holdings.

How will the dowry/inheritance practices and other related *Cosmopolitan* social rules eventually be affected by these negotiations? The outcome obviously depends upon the duration of the present set of environmental, political, and economic factors, but there are strong indications that the current trend within the EU member-states towards increased political and economic integration, expansion and stability will continue for some time to come (Wilson and Smith 1993). Should the present conditions outlast the current generation of farmers in Ancient Korinthos, then it is probable that their social rules will be significantly altered.

My present research can only confirm that such rules are presently being negotiated and that they are likely to move towards a *Parochial* configuration that reinforces and legitimates increased cooperation between local farmers. I have some small amount of evidence which also suggests that one of the more common ways of negotiating inhibiting social rules after a new agricultural practice is decided upon is the public explanation of the decision in terms of economic pragmatism coupled with the private justification of the decision in terms of moral obligations to assist less fortunate, more needy, neighbors. But I suspect that this is just one of a number of innovative attempts to reconstruct social rules that are presently taking place in Ancient Korinthos.

Finally, two of the guiding principles of this essay and this volume are (1) that social science research in Greece can only benefit from a closer analysis of the ways in which cultures and their environments operate as interactive

systems, and (2) that to do so effectively we must continuously emphasize the role of human beings as active decision-makers within *both* of those systems. In this examination of the relationship between agricultural practices and the formation and change of social rules in Ancient Korinthos, with an emphasis upon the specific problem of dowry/inheritance practices and land fragmentation, I have tried to demonstrate that the two approaches to these issues which fail to consider these principles produce deterministic, ahistorical, and mutually contradictory explanations for the phenomena.

A third approach, Risk-Management or Risk-Buffering, begins with principles similar to the above and is thus able to show convincingly that agricultural practice and social rules operate in an integrative and complementary fashion. The only flaw in this approach is that while its proponents clearly recognize the active, decision-making role that humans play in interacting with their environmental systems, they just as clearly fail to do so when considering their cultural systems. This omission leads to a subtle brand of ecological determinism if one attempts to extend their analysis into the future rather than the past. I have suggested some modifications to that approach that are designed to correct the deterministic tendencies and permit the ethnographer to view individuals as full decision-makers in shaping their environmental and social interactions.

But the fully-interactive approach to human behavior offered in this paper is certainly not new to ethnography; it has merely been uncritically neglected in the course of our modern, eclectic theoretical odyssey. More than half a century ago, my professor and mentor, George P. Murdock, suggested that

Society...with the environment, poses problems for the individual, teaches him time-tested cultural solutions, and enforces his observance of them. The solutions themselves, or culture, reside only in the habit systems of individuals, constituting such of their habits as the members of a society or group share with one another. Of itself, therefore, culture can exert no influence upon an individual; expressions like "the coercion of custom" and "cultural compulsives" are meaningless and misleading. Culture is merely the lesson to be learned; the teacher and disciplinarian is society or its agents—parents, associates, wielders of authority, etc....Interpersonal relationships constitute the cement of society. Whenever two persons come into face-to-face association they adjust their behavior to another, in part by bringing into play cultural norms with which they are already familiar, and in part by developing new reactions through the learning process. (1941:141-142)

If modern Greek ethnography can retain these principles in the examination of agricultural practice and social rules, then, just as with the farmers of Ancient Korinthos, we can work these problems out.

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FINDING MEANING IN MODIFICATIONS OF THE ENVIRONMENT: THE FIELDS AND ORCHARDS OF MANI

Peter S. Allen

Introduction

The nature and effect of human activity on the environment and landscape has long been a concern to humanity, but it was perhaps only during the last two centuries that that concern began to manifest itself in ways that are apparent today. Although as early as the fourteenth century Petrarch climbed a mountain for the sheer aesthetic experience, it was not until the nineteenth century that we can discern a shift from viewing nature in a hostile way to an appreciation of its more romantic charms. John Rennie Short invokes the names of the Romantic poets—Byron, Wordsworth, and Shelley—as well as various painters in his discussion of this change in the perception of wilderness (1991:16). Today these concerns are echoed in the writings of contemporary historians and architects like John Brinckerhoff Jackson (1984, 1994), Simon Schama (1995), Michael Hough (1990), and John Rennie Short (1991). It is Jackson who reminds us that “since the beginning of history, humanity has modified and scarred the environment to convey some message” and further that “we should learn to differentiate among those wounds inflicted by greed and destructive fury, those which serve to keep us alive, and those which are inspired by love of order and beauty...” (1994:vii). It is the second group named above—modifications made in the interest of subsistence—that concerns us here. Naturally, there is considerable variation in the extent to which such modifications affect the landscape; some being harsh and obtrusive, others “have been so well assimilated into the natural environment that they are indistinguishable and unrecognized for what they are” (Jackson 1984:8). In this paper the modifications in question fall somewhere between these two extremes,

producing in the end a rather pleasing and harmonious landscape that leaves no doubt as to its origins, but does little violence to the natural environment.

Mani

The region known as Mani comprises the central peninsula of the southern Peloponnesos. It is one of the bleakest parts of Greece: the soil is thin and rocky and the landscape marked by steep hills and low mountains, the southern extension of the Tayegetos range. Travellers to the region in the eighteenth and nineteenth centuries characterized Mani as the most wild, deprived and densely populated part of Greece. Generations of Maniats have eked out a living here by tilling the poor soil or raising sheep and goats, often supplementing their meager agricultural and pastoral outputs with fishing and plunder from passing ships. In the eighteenth and first half of the nineteenth centuries the population was artificially inflated by migrants seeking refuge from Ottoman rule, a phenomenon often witnessed in the past (Saitas 1990:12-28). This placed increased pressure on the already overtaxed resources of the area and resulted in the further intensification of agricultural and pastoral activities. It also contributed to and exacerbated the often violent inter-clan conflict that plagued the region and helped give rise to the well-deserved Maniat reputation for fierce clan feuding and vendetta.

Life in Mani was and is still hard, and like Greeks elsewhere, Maniats are prone to describe existence as *agonia* (struggle), in which they see themselves pitted against an inhospitable environment (cf. Friedl 1962: 75; Campbell 1964: *passim*). Seremetakis shows how Maniat women articulate their struggle through the idiom of *ponos* or pain, an important dimension of their existence (1991:115 *et passim* and 1993). Conditions in Mani are truly more harsh and challenging than in much of the rest of Greece and the unfavorable circumstances of the environment have only been intensified in periods of overpopulation. Thus, the inclination to demarcate clearly the line between nature and humanity has been all that much greater in Mani than elsewhere in Greece.

Living under difficult conditions in an environment perceived as hostile generated a variety of responses on the part of Maniats of all periods. Houses and every form of structure were not only places of dwelling, work and worship, but bastions against the threatening elements, as well as cultural statements. Villages were places of refuge and their architecture reflected the efforts of the inhabitants to overcome the harsh conditions of their circumstances. Likewise, the fields surrounding Maniat villages represent a significant effort by the inhabitants to differentiate themselves from nature and tame a hostile environment. Some attention has been given to the role of

architecture and built forms in the Mediterranean (Artoshenko and Grundy 1991) and more specifically Greece (Pavlidis and Sutton 1995a), but little if any attention has been directed to the subject of environmental modification for agricultural and pastoral purposes. There have been a number of impressive ecological studies in Greece and elsewhere (e.g., H. Forbes 1976; M.C. Forbes 1976; Forbes and Koster 1976; Gavrielides 1976a, 1976b; Koster and Koster 1976), but most focus on aspects of land use and are not concerned with issues of human modification of the landscape *per se*, nor the implications of such modifications.

In this paper certain aspects of the non-architectural built environment are examined. For, like true architecture—residential and other buildings—the fields and orchards of Mani are embodiments of culture both reflecting and shaping human perceptions and behavior (cf. Pavlidis and Sutton 1995b). They constitute what Jackson has called a “vernacular landscape,” whose

spaces are usually small, irregular in shape, subject to rapid change in use, in ownership, in dimension...(such) that there is always a vast amount of ‘common land’—waste, pasturage, forest, areas where natural resources are exploited in a piecemeal manner; that its roads are little more than paths or lanes, never maintained and rarely permanent; finally that the vernacular landscape is a scattering of hamlets and clusters of fields, islands in a sea of waste or wilderness changing from generation to generation. (Jackson 1984: 149-151)

Only later, Jackson argues, did this situation give way to one where the distinction between domestic, cultivated, and wild lands was more clear cut (1984:152-3). This description, which Jackson associates with Medieval Europe, is remarkably evocative of modern Mani. Its vernacular landscape has meaning and can be viewed as a collective statement by the inhabitants about the human condition and its relationship to the elements. To treat it as anything else would be to shortchange the generations of Maniats who built and used the elements of this landscape and would further constitute a misunderstanding of culture itself and the relationship between culture and human activity.

Related to this debate, but a bit beyond the scope of this paper, is the question of community. Vernacular landscapes of all types are reflections of human organization of space and time (Jackson 1984:156) as well as the products of collective enterprise, albeit a largely unconscious and uncoordinated one (Jackson describes them as “lacking evidence of political organization” [1984:149-50]). Nevertheless, modified or created, landscapes, especially rural ones, should be viewed as “manifestations of community” (Jackson 1984:12, 150-51). Moreover, as Jackson also points out, such landscapes also contribute significantly to their creators’ and users’ sense of identity, especially when they are aesthetically pleasing (1984:59-64).

Traditional Subsistence

Agriculture is the traditional basis of subsistence in Mani, although this has always been supplemented by other activities including pastoralism, fishing, commerce, piracy and the preying on passing ships, as well as the salvaging of loot from shipwrecks along the rocky coast. There is also a relatively long seafaring tradition and Maniats frequently signed on as merchant sailors. Another occupation, common in the eighteenth century especially, was that of mercenary and many Maniats served in this capacity at home and abroad.

Agriculture

Mani is hot and dry in the summer but has relatively mild wet winters, so crops have always been planted in the fall and harvested in the late spring or early summer, as is the practice in most of southern Europe. Maniats practiced a mixed base subsistence agriculture of which the principal staple was a cereal grain, most often wheat or barley, grown mainly on terraces in the south and in open fields elsewhere. Vegetables were cultivated in garden plots and various fruits and nuts, such as figs and almonds, were produced in orchards in the northern and western parts of the peninsula. Maniats often kept small grape arbors in the gardens and courtyards of their houses, but true viticulture was limited to parts of the northern sector, and even there it was never practiced on a very large scale. Olive trees were cultivated in Mani from an early date, originally on a rather small scale, but increasing in the late nineteenth and twentieth centuries as the population dwindled and the remaining inhabitants switched from labor intensive grain cultivation to less onerous olive cultivation (see Allen 1973). More and more farmers abandoned grain terraces and planted their fields in olive trees, a trend which continues today. Olive trees in the lower portion of Mani are stunted as a result of thin soil and other poor growing conditions, but their yields are remarkably high, as is the quality of the oil produced by them (Andromedas 1962: 103).

Pastoralism

Most Maniat families kept two or three sheep or goats, but rarely enough to meet their needs for dairy products and meat. Herding was a full time activity for only a small minority of Maniats in the past. Full time shepherds generally exchanged animal products for agricultural produce with their fellow villagers in a kind of economic symbiosis. Flocks were grazed mainly on the hills and mountainsides where cultivation would have been impossible. The sparse vegetation there supported small herds of sheep and goats, but returns were minimal, making shepherds even poorer than the local cultivators. Shepherds

also grazed their animals on fallow agricultural land and on the stubble of harvested grain fields. Various arrangements were made for grazing rights in such cases, most of which involved payments of cheese and/or lambs by the herder to the landowner.

In the past large numbers of transhumant sheep and goat herders from mountainous parts of Arkadia to the north wintered in the coastal and low lying areas of Mani, taking advantage of the region's mild winter climate and often putting a tremendous strain on local resources. In *Aspida*, a pseudonym for a relatively prosperous village on the eastern coast of Outer Mani south of Gytheion where I conducted fieldwork for more than 14 months in 1970-7, only three transhumant families came for the winter of 1970-71. Before World War II, *Aspidans* maintain that it was not unusual for as many as 30 families, each with flocks of 100+ sheep and/or goats, to come each winter. In those days there was terrific pressure on local resources as a result of this temporary influx and shepherds vied with each other for access to the best grazing lands, whereas in the 1970s and 1980s villagers competed for the meager payments of cheese or lambs the transhumants offered in return for grazing rights (cf. Campbell 1964:225-247).

Landscape Modification

Basic subsistence production in Mani has always required greater efforts than in most other parts of Greece, and it often involved substantial modifications of the landscape, in particular terracing of hillsides and the construction of high stone walls in low lying areas. Terraces, called *loures* or "belts" in Mani, are literally carved into the steep hillsides. Although terracing is a common agricultural practice in Greece, nowhere in the country does one find terraces of such dramatic prospect as in Mani (for more on terraces, see Forbes and Koster 1976). According to Saitas (1990:22), most of the terraces were probably built between the 15th and 19th centuries when Mani became a refuge area for those fleeing Ottoman oppression. The population of Mani in those years swelled beyond the capacity of the environment to provide adequate subsistence with contemporary technology, thus creating considerable pressure to expand the base of agricultural exploitation. Terraces were carved into the steep, inhospitable hillsides, held in place by dry stone retaining walls. This labor intensive effort converted sterile hillsides into fertile ground, providing tier upon tier of narrow terraces for the planting of cereal grains—wheat and barley for the most part. These terraces vary a great deal in size and shape, but one of the most remarkable features is that some comprise only a few square meters in area, a reflection of the desperate poverty of the people who built them and a testament to the ability of the eighteenth and nineteenth century inhabitants to find a solution to their plight. Today virtually no cereal crops are grown on the

terraces of Mani, although a good number have been planted in olive trees. Many are abandoned and neglected, slowly reverting to hillside as the stone walls crumble and collapse.

Fields in the Maniat lowlands are usually surrounded by stone walls. Some, like those around the village of Alika in the south, are as high as three meters and more than a meter thick. These walls have two functions: they serve as a repository for the myriad rocks and stones which have to be removed from any plot before it can be cultivated, and they help prevent the erosion of valuable soil, which lies in a thin veneer over the bedrock, by the relentless winds which sweep across the peninsula. Elsewhere the walls are lower and merely delineate property boundaries. Fields are often studded with large outcroppings of bedrock which look for all the world like whale backs protruding from the sea. These outcroppings interfere with cultivation and sometimes give a ragged appearance to Maniat fields and orchards as crops and trees are planted in irregular fashion around these impediments.

The ultimate result of these efforts is a highly constructed, almost sculpted environment. Maniat villages are surrounded by fields and terraces, delineated by endless stone walls and set off from their wild surroundings by the regimented profiles of crops and trees growing therein. The fields and orchards of Mani, like its buildings and settlements, are built forms, deliberate statements challenging the environment and asserting human hegemony over it. Such a tableau exerts a comforting influence on the inhabitants of an otherwise hostile world and must have been especially comforting in centuries past when Mani was far more isolated from the outside world and ameliorating influences were few.

Periodically an intellectual debate arises as to whether architecture and other modifications of the environment impose order on a chaotic nature or whether it is nature which is orderly and the intrusion of human modification chaotic (see Clay 1994; Hough 1990; Jackson 1984, 1994; Pavlides 1993; Rudofsky 1964; Short 1991:38-39). For example, John Rennie Short observes, "where agriculture used to be praised for civilizing nature, it is now criticized" (1991:39). This is not an issue for Maniats, however, to whom nature and the elements are clearly chaotic and threatening, whereas human creations are seen as establishing order and domesticating nature. The imagery of Maniat poetry and laments, as well as less formal everyday discourse, is permeated with references to the harshness of the environment and the human struggle to tame it.

A related discussion has focussed on human perception of the environment. Jackson argues that "since the beginnings of man's existence on earth, the wilderness has engendered two sorts of reactions; hostility and fear on the one hand, a sense of protection on the other" (1994: 74). For Maniats, the wilderness beyond their homes and cultivated fields has been viewed more malevolently than benevolently, and those who frequent the wilderness, mainly shepherds, are

usually marginal creatures not fully integrated into village society. In Aspidia a man who had killed his own father during an argument was forced to live far outside the village when he returned from serving his prison sentence. His uncivilized act condemned him to an existence in the uncivilized wilderness, an appropriate match in the eyes of local villagers.

All modifications of the environment by humans, be they for habitation or cultivation, are forms of domestication, attempts on the part of humanity to differentiate itself from nature and bring nature under control. The Romans understood this well and thus dug a shallow trench called a *pomerium* around all their settlements, even those that were heavily fortified. Sometimes this was quite perfunctory, just a plowed furrow, while at other times it was a more substantial ditch; but no matter how minimal, it had great symbolic value since this bit of disturbed soil said, "Domestic space ends here." Although few societies make such formal demarcations as the Romans, virtually all peoples recognize, if only implicitly, a distinction between residential and non-residential space.

In Mani, however, in contrast even to other parts of Greece and Europe, the principal distinction is not between residential and non-residential space, but rather between those parts of the environment modified for habitation *and* cultivation as opposed to those wild lands outside the sphere of human activity and purpose. Jackson, for example, maintains that the "distinction between home and garden on the one hand, and open fields and grazing land on the other..." is an "ancient" one (1994:124), but that Europeans traditionally distinguished three types of rural lands: farming, grazing and woodland (1984: 152-3), a distinction similar in some ways to the Maniat who distinguishes farming, grazing and unforested wasteland—mountain scrub too coarse even for sheep and goats. Domestic space in Mani is lumped together with areas of cultivation and the whole then distinguished from wild uninhabited and uncultivated lands. Seremetakis invokes the trope of interiorization to describe this phenomenon in Mani, arguing that "the inside/outside polarity that separates household space from outfields, grazing land and seashore in other parts of Greece does not hold true for Mani...rather, inside/outside categories order the relations between cultivated, tended land and the wild....In agriculture, interiorization entails the movement beyond a residual cultivation line (indicated by stone walls) and the erection of enclosed space which brings uncultivated land inside" (1991:202, 206). She further argues for a connection between the orderliness of the household and Maniat women's striving for an orderly appearance to the fields, which are mainly cultivated by them (1991:95).

Despite the lack of formal delineation between residential and non-residential cultivated space in Mani at one conceptual level, the inhabitants do in fact recognize certain distinctions between these sectors and behave accordingly. One of the key variables here is time of day. Few villagers will venture abroad at night, preferring to remain within the familiar confines of the

domestic residential sector. If they do have cause to go to their fields and orchards at night, they will do so, but only reluctantly, and it is a rare Maniat indeed who will brave a trip into uncultivated/uninhabited space after dark, for Maniat folklore is replete with all manner of creatures and bogeys who populate the night and discourage nocturnal forays beyond delineated residential spaces.

Areas of habitation are not formally delineated in modern Greece, including Mani; rather, areas of residence usually blend easily into the cultivated surroundings. Fields and orchards begin (or end) in the backyards of houses located on the outskirts of villages. The outer boundaries of the cultivated areas are sometimes marked by stone walls although this is not always the case, especially with olive and other orchards whose extreme limits are frequently not walled and often blend gradually into the wild landscape. Areas beyond the zones of cultivation are the domain of shepherds, and if privately owned, are sometimes enclosed by stone walls or marked by cairns at strategic points. Otherwise, they are rarely distinguished from unused land.

Like cultivated land in the rest of Greece and other parts of the world, cultivation in Mani represents a statement by the inhabitants that they are different from nature and do not want to be submerged or consumed by it. Rather they want to separate and distinguish themselves from the natural environment as well as dominate and control it. Like the body paint of Levi-Strauss' Amazonian tribes, the fields, orchards and architectural complexes of Mani can be viewed as statements by which Maniats have tried to differentiate themselves from the natural environment. For the people of Mani there is perhaps a greater need for such differentiation since they are so remote from more populated and urban areas of Greece and because the environment is so overtly hostile. Thus, the villages and hamlets of Mani and their surrounding fields and terraces are clearly delineated and differentiated from the more distant untamed and uncultivated hillsides and mountains.

Such an environment must have been a great comfort to villagers who were constantly battling the environment as well as each other. It may have also provided a counterpoint to the view of themselves as uncivilized due to the feuding which drove them to such unnatural acts as murder and even filicide and patricide. Mani has a well deserved reputation for clan feuds and vendettas which plagued the region in the past and continued even into the twentieth century. There is even some evidence that villagers differentiated these two environments, the natural uncultivated on the one hand and the cultivated/created on the other, linguistically. For example, Aspidans refer to nearby mountains as *Ta Aravika*, the "Arabian" mountains, which gives them an exotic and somewhat forbidding character since the Arabs traditionally have been perceived as both exotic and threatening. In a neighboring area of Mani the surrounding mountains are called *kakavounia*, the "evil mountains." Other toponyms are equally suggestive. One desolate outcrop of rock outside Aspida was called the eagle's beak which suggests untamed wilderness as opposed to

areas of cultivation which are generally associated with family names, thus reinforcing the aspects of domestication and human presence.

Saitas (1990), in a discussion of Maniat architecture (which, by inference at least, includes the fields and terraces of the region), characterizes the villages as "harmonized" with the natural environment. Moreover, Eleftherios Pavlides (1993), an anthropologically sensitive architect, has argued that for reasons of security villages all over the Mediterranean were sited and/or constructed so as to be virtually invisible from the sea. In Mani many of the villages tend to blend into their natural surroundings, but there is no disguising other modifications of the environment. Stone walls delineating fields of irregular geometric shapes are visible from great distances and the terraced hillsides stand out in profile like the sides of stepped pyramids. There can be no mistaking the presence of humans in such a clearly modified landscape.

This is understandable in light of the foregoing discussion where it has been argued that the Maniats have not envisioned themselves as part of nature or as something that had to blend in with nature, but instead have been intent since earliest times to distinguish and differentiate themselves from nature. Although this is most obvious in the architecture of houses and villages, it is also manifest in the configuration of agricultural fields and terraces.

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Agrarian Ecology in the Greek Islands: Time Stress, Scale and Risk

Paul Halstead and Glynis Jones

A botanical study of crop processing was undertaken on the semi-arid, southern Aegean islands of Karpathos and Amorgos (Jones 1984; 1987). The present article provides details of the crop processing activities, and some contextual information concerning the wider agricultural economy. Attention is drawn to three aspects of this wider economy (time stress, scale, and risk) which are of particular significance for understanding both recent 'traditional' and ancient farming practice in the region. Amorgos is discussed in greater detail as the period of field work was longer.

The Study Areas

On Karpathos, the area chosen was the northern part of the island, around the isolated village of Olimbos. Olimbos itself is a nucleated village lying on the slopes of a steep ridge which provides concealment from the sea and the pirates who once, so local legend insists, posed a serious threat. Immediately below the village are vegetable/pulse gardens, some irrigated. Fields are widely scattered, but arable farming is concentrated in the alluvial valley of Avlona, an hour's walk to the north. Here a cluster of field houses is used as a temporary base during the peak periods of agricultural work. Each field house has its stone threshing floor and a store for the hay and chaff used as animal fodder during the winter.

Our two week visit in June 1980 coincided with the reaping and processing of barley (*Hordeum vulgare*, το κριθάρι) The wheat (το σιτάρι, a "maslin" mixture of bread and macaroni wheat, *Triticum aestivum* and *T. durum*) was just ripening and the pulses had for the most part already been harvested, threshed and cleaned for storage. Pulses included broad bean (*Vicia faba faba*, το κουκιά), field bean (*V. faba minor*), lentil (*Lens esculenta*, η φακή), pea (*Pisum*

sativum, το γλυκίδι), *Lathyrus clymenum* (or *L. articulatus*, ο αρσάκης) (A. Sarpaki and G. Jones), *L. ochrus* (η σπρίκα, also η ξετρίχια), grass pea (*L. sativus*, το λαθοόρι), common vetch (*Vicia sativa*, ο βίκος) and bitter vetch (*V. ervila*, το ρόβι). All these crops were said to be autumn sown, 'around November, depending on the rain'. In addition, chick pea (*Cicer arietinum*, το ρεβίθι) and *Phaseolus/Vignasp.* (το φασόλι) were being grown as summer crops, along with tomatoes, etc., while a single row of globe artichokes bounded some of the cereal fields.

Grass pea, common vetch and bitter vetch were grown as animal feed, the remaining pulses and wheat for human consumption. One informant described human consumption of barley as a thing of the past, but others implied that barley was still eaten by both man and livestock. While most of the species listed are widely known as crops, both in the Aegean and elsewhere, *L. clymenum* and *L. ochrus* are rather more unusual. *L. clymenum*, recorded as an occasional fodder crop (Usher 1974), is also grown for human consumption on the Cycladic islands of Thira and Anafi (Sarpaki and Jones forth. [1990]). *L. Orchus*, also an occasional fodder crop, is grown for human consumption on Euboea (as το λαθοόρι) (Halstead 1987), and its cultivation is also reported from Patmos in the Dodecanese (Townsend and Guest 1974).

In Olimbos farming was very much in decline and the mainstay of the local economy was remittances from emigrés in mainland Greece, Australia and the USA (in the past many men had worked abroad as itinerant stone masons). Agriculture was largely in the hands of middle aged and elderly women. The higher poorer terraces were widely abandoned and there were other indications that the scale of cultivation was significantly reduced: for example, in southern Karpathos, June is known as "theristis" (ο θεριστής,—reaper) and July as "alonistis" (ο αλωνιστής—thresher), but in Olimbos in 1980 the whole cycle was proceeding far more rapidly. With the exception of petrol-driven corn-grinders, which had led to the abandonment of all but one of the windmills perched on the ridge over the village, farming was apparently unmechanized.

The second area chosen for study was the community of Akesini in southern Amorgos. Arkesini itself is again a nucleated village, on the edge of a land-locked basin, but the principal focus of investigation was an outlying group of dispersed hamlets on the gently rolling Kolofana plain. Local tradition has it that these hamlets were formed "100 years ago": with the suppression of piracy and redistribution of monastic land by the modern Greek state, some farmers moved out of Arkesini to take up residence in their field houses or "stavloi" (οι σταύλοι). In Amorgos, the dissolution of the major monastic estates is assigned to the period 1870-1915, while the last reported pirate raid was in 1835 (Sutton 1978).

After the dissolution, partible inheritance, as elsewhere in Greece (Thompson 1963), led to fragmentation of land holdings, but especially since World War II some farmers have been able to extend or consolidate their

holdings by purchases from emigrating relatives. Emigration also radically altered the balance between available land and available labor, although latterly mechanization has to some degree balanced this change. In spite of emigration and the abandonment of the highest terraces, southern Amorgos is still farmed on a large scale compared with the infertile north of Karpathos. The far-flung fields are connected by cobbled mule tracks, said to have been built in recent decades by communal labor—three days per year from all 15-60 year-olds.

Villagers report that farming used to be dominated by subsistence production of wheat and barley and by cash cropping of tobacco. The cereals were grown in alternation with bare (i.e. ploughed) fallow (perhaps unploughed on some of the terraces), while tobacco was planted in place of fallow on some of the better fields. In the 1930s tobacco was abandoned (because of competition of Macedonian tobacco) (Sutton 1978) and government agronomists initiated the replacement of fallow with pulse fodder crops to improve productivity of livestock and so provide a cash income from cheese and from kids and calves sold for meat. This was essentially the system which prevailed in 1981.

Our visit covered six weeks in June and early July and coincided with the threshing and winnowing of pulses and the harvest and processing of cereals. The pulse crops were lentil (η φακή), pea (το κατσούνι), broad bean (το κουκκί), chick pea (το ρεβίθι) and black-eyed bean (*Vigna unguiculata*, το φασόλι), grown as human food, and grass pea (το λαθούρι) and common vetch (το βίκος), grown for animal feed. Bitter vetch (το ρόβι) was a regular contaminant of grass pea and had been grown as a fodder crop some years previously. The cereal crops included wheat (again a mixture of bread wheat—ο γκριλιάς—and macaroni wheat—η μαυραγάνη), grown for human consumption, and oat (*Avena sativa*, η βρωμη) and barley (*H. vulgare*) grown as fodder. By far the most common crop, however, was "migadhi" (το μιγάδι), a wheat/barley maslin grown principally for the making of bread.

Ideally, sowing started in November with broad bean, common vetch and grass pea. Barley and "migadhi" were sown through November and December, followed by wheat and lentils during January and February. The fields were said to be ploughed at right angles to the direction followed in the previous year and were mostly dressed with artificial fertilizer—nitrate and phosphate on cereals, phosphate only on pulses for human consumption. Animal dung was highly valued but scarce: one farmer, with a few work animals and a few goats, expected to manure 1-2 str. (0.1-0.2 ha.: the "stremma"/το στρέμμα=1000 m²) each year in September, selecting the poorest of his level fields (i.e. avoiding terraces). Cereals and pulses were usually grown in rotation (50 out of 71 fields sampled) and, as elsewhere in the Mediterranean, the abandonment of alternate year bare fallowing had not been accompanied by the introduction of irrigation. Every few years, however, fields were bare fallowed to control weeds and some of these fields were planted in the spring of the fallow year with unirrigated

summer crops (τα καλοκαρινά), including chick pea, black-eyed bean, tomato, cucumber, sesame, onion, watermelon, etc. Ideally fields selected for summer crops were ploughed in autumn, then three times in March-early May. The first of the spring ploughings (το νιάτο) was relatively shallow, the second (το δίβολο) was deeper and at right angles to the first, while the third (το τρίβολο) accompanied sowing (Forbes 1976a).

Processing of Winter Cereals and Pulses

All the winter cereals and pulses were processed in a broadly similar way, regardless of whether they were intended for animal or human consumption (Hillman 1984b, 1985; Lerche 1968; Rasmussen 1969; Steensberg 1971). The processing of summer crops was not observed, but on Amorgos the small chick pea and black-eyed bean crops were harvested pod by pod and so will have posed quite different processing problems from their winter counterparts.

Harvesting (το θέρισμα)

Cereals were usually reaped with a sickle (το δρεπάνι) (Benaki Museum, Athens 1978). On Amorgos, the crop was cut quite low so that most of the straw was harvested. On Karpathos, the crop was reaped at mid-height (just low enough to harvest the lower ears), leaving much of the straw in the fields, but in the past crops were cut lower and the shortest barley was uprooted. Pulses were harvested by uprooting using a blunt sickle or, in some cases on Amorgos, were cut with a scythe (η δραπεάνα). Either way, a large amount of stalk and leaf was collected with the seed pods.

While harvesting, a varying degree of care was taken to leave weeds behind in the field. On Amorgos, large robust weeds with obvious coloring, such as *Rumex pulcher*, were often left (see Appendix for local common names). Conservative farmers preferred the sickle to the reaping machine (and uprooting to the scythe) because of the opportunities for such selective harvesting. On Karpathos, farmers even tried to leave behind such inobvious weeds such as darnel (*Lolium temulentum*). This was made easier by their practice of reaping cereals high and is also much more practical on poor, stony ground, where the crop was sparse, than on fertile soil. On Amorgos, the cleaning out of darnel seeds took place in the later stages of crop processing and failure to do this effectively was said to have occasioned severe illness in the past.

After reaping, cereals were tied in bundles and pulses piled in heaps and both were left in the field to dry for a few days, before they were transported by donkey or mule to the threshing floors. The crops were piled up round the edge of the floor to await threshing, sometimes guarded by dogs.

Threshing (το αλώνισμα)

Bundles of harvested cereals or pulses were strewn on the threshing floor (το αλώνι) and left to dry further (Benaki Museum, Athens 1978). Threshing, to release the seed, was usually accomplished by trampling under the hooves of a team of animals (various combinations of oxen, cows, donkeys and mules) (Theokharis 1973). The team (not anchored to a central pole, as in some areas) was driven around the circular floor by a person wielding in one hand a stick and in the other a tin can for catching the animals droppings. A threshing sledge (Karpathos—το βολύδρο), embedded with stone or metal blades, was only rare in use. On Karpathos, the reason given was that the female workforce lacked the ability to make sledges. On Amorgos, threshing sledges were said to chop the straw more finely than was ideal for animal fodder.

Threshing characteristically took place in the heat of the day when the harvested crops were at their driest and so most likely to break up. On a good, hot day a full threshing floor might be completed in a few hours, while in cool, cloudy conditions it might take several days. Sometimes, as the crop was trampled down, more sheaves or bundles were added to the partly threshed crop. Small quantities of pulses were sometimes threshed by hand, using a long stick (unjointed flail).

Winnowing (Amorgos—το λύχνισμα, Karpathos—το ξαχέρισμα)

The next stage in the process was the separation of the chaff and straw (leaf, stem, and pod in case of pulses) from the grain by winnowing. The threshed crop was tossed into the air with a winnowing fork (το διχάλι), light chaff and straw were carried aside by the breeze, while the grain, heavier chaff and straw fragments fell straight downwards (Benaki Museum). This process could take anything from a few hours to several days depending on the strength and quality (i.e. persistence and direction) of the breeze. In the later stages of winnowing, when the pile being winnowed was more grain than chaff, a shovel was used instead of a fork.

Ideally, winnowing was carried out in a gentle steady breeze so that the light fraction of the crop (Amorgos—η πάσπαλη) was carried only a few feet. (Sometimes a rag was tied to a stick to monitor the strength and direction of the breeze.) Branches of bushes, e.g. juniper, were often placed on the lee side of the threshing floor to trap fragments of chaff and straw and when winnowing was complete the resultant straw and chaff pile was often covered by branches to prevent it from blowing away. As a result, juniper berries sometimes turned up in the winnowing by-product.

Small crops could be winnowed without tools—simply being lifted by the handful and allowed to fall. If the crop was large, one end of the pile might be

winnowed first, the light chaff and straw accumulating on top of the remaining unwinnowed crop. This would then be raked aside before winnowing proceeded to the crop below. If the crop was very large then a part of it only might be threshed first and partly winnowed (Amorgos—το παραλύχνισμα) in order to reduce the volume on the threshing floor. More of the crop was then piled onto the floor, on top of the partly winnowed fraction, and a second threshing followed.

Second Threshing

On Amorgos, this followed the first winnowing and was carried out under two circumstances: first, when the crop was too large to be accommodated in a single threshing (in practice, only true of cereals) and, secondly, when the crop was rich in barley. In the first instance, more crop was added and threshing continued with the same purpose as before. In the second case, the purpose of the second threshing (το στρούμβισμα, cf. English "humming") was to break off the barley awns (το άγανο, cf. Karpathos—ο τσούνακας) which are very rough and can cause irritation if allowed to get into the flour for human consumption. Indeed, at least some farmers on Karpathos did not use barley chaff for fodder for this reason, though on Amorgos this was not seen as a problem.

Second Winnowing

Winnowing was now carried to completion (as was the first winnowing when no second threshing was involved). In the final stages, fragments of straw were raked off the top of the grain pile, usually with a thyme bush (which sometimes introduced thyme flowers into the crop). If the crop was large, the final stages of winnowing were often accomplished piecemeal (Plate I). The windward side of the pile was winnowed first and, when that was as clean as possible, the next section was tackled and so on. As each section approached completion, it was worked over to the fully winnowed pile of grain. Sometimes on Amorgos, an incompletely winnowed fraction—the aposoria (τα αποσώρια)—was left between the grain and chaff piles at the end of winnowing. It contained a higher proportion of weed seeds and heavy straw fragments than the grain pile and, in the case of maslin, a higher proportion of barley. It was often fed directly to domestic animals and sometimes comprised a substantial proportion (up to one fifth) of the total grain.

Coarse Sieving

A coarse sieve (Amorgos—το δρεμόνι, Karpathos—το ρεμόνι; mesh size approx. 6-10 mm) was used which allowed grain to pass through while retaining

large straw fragments, weed heads, unthreshed ears and pods etc. Coarse sieving was a recurrent operation during and after (but never before) winnowing. Grain cleaning on the threshing floor was usually carried out by two and often three or four people at a time, so that one or two might winnow, another use a thyme-bush rake and one or two be involved in coarse sieving. Coarse sieving was often not performed on fodder crops and might also be omitted if winnowing was very thorough. Conversely, on a still day, coarse sieving might partially replace winnowing, but only for small quantities of crop.

The coarse sieve was used as follows:

(i) Between the piles of grain and light chaff and straw, which accumulated during winnowing at opposite ends of the threshing floor, was an ever-diminishing pile of grain and heavier straw fragments. This was often sieved to speed up the process of winnowing.

(ii) Rakings from the top of the grain pile were often sieved as they contained significant amounts of grain; alternatively they might be kept as "aposoria."

(iii) The fully winnowed grain was usually sieved, the grain being poured slowly and from a height so that any dust was "winnowed" away.

The sieve could be rested on an upright fork propped in the grain pile (Benaki Museum). On Amorgos, the fraction retained by the coarse sieve (τα κόνταλα, cf. English 'cavings') might be amalgamated with the straw and chaff pile, but was usually fed directly to domestic animals. (Sometimes, "aposoria"—the incompletely winnowed fraction—were sieved, the contaminated grain being fed to chickens and the cavings to larger animals). On Karpathos, the coarse sieve by-product was often rethreshed, usually on a small scale with a stick, and then winnowed.

The completion of winnowing and coarse sieving for each crop was often marked on Amorgos by a brief ceremony. First, the shape of a cross was drawn in the grain pile. Then four winnowing forks and shovels were set in the sides of the grain pile, in the form of a cross, and a simple cross made from a broken stick was placed in the top of the pile. Once the grain had been thus "blessed," it was measured using a c. 18 litre olive tin housed in a niche in the wall of the threshing floor. One tin was reckoned to contain half a "kilo" of grain (το κοιλό was a unit of volume thought equivalent, on average, to 32-33 kg of wheat, lentil, pea or black-eyed bean, and 21 kg of oat). The measured grain and the chaff were then bagged up and taken into store. On Amorgos commercial sacks woven from goat hair (each 70 x 135 cm sack was said to require the clippings from 7-10 goats). Finally, the threshing floor was swept before the next crop was threshed and the sweepings sometimes fed to chickens.

Fine Sieving

A fine sieve (Amorgos—το γυροκόσκινο, Karpathos—ο αρολός; mesh size approx. 2-2.5 mm), which retained the grain but allowed small weed seeds etc. to pass through, was also used for grain cleaning. Fine sieving tended to occur piecemeal throughout the year (Benaki Museum) and was associated with food preparation and the cleaning of seed corn. Fodder crops were not usually fine sieved.

As the crop was sieved with a circular motion, light components such as straw, pods and weevil-infested seeds collected on top and could be scooped off. Such scoopings (cf. English "chob") were often mixed with the residue from the bottom of the sieve and, on Amorgos, fed to chickens. Fine sieving could be very thorough, leaving the minimum of cleaning to the final stage.

Hand Sorting

On Amorgos at least, weed seeds, straw nodes, pod fragments etc. not already removed were picked out by hand (το πάστρεμμα). This cleaning, which was often very thorough, was applied to crops destined for human consumption and immediately preceded grinding into flour or cooking. The hand-pickings were again used as chicken feed. On Karpathos, sieved grain was also apparently washed and barley subjected to roasting (το φρίξιμο) and beating to remove the stubs of barley awns.

Food preparation

After milling of cereals, a flour sieve (η τριχιά; mesh size 1 mm) was used to clean out bran, barley hulls and, on Amorgos, barley awn stubs. Bread was eaten both fresh (said traditionally to have been baked every eight days or so) and in the form of a hard, twice-baked "rusk" (το παξιμάδι) which keeps for several months (Sanders 1984). Of the pulses grown for human consumption, pea, *L. ochrus* and *L. clymenum* were eaten as "fava" (η φάβα), that is split in a hand-mill. On Karpathos the loose testas or 'skins' were said to be winnowed away. *L. ochrus* and *L. clymenum* were also eaten green, and on Amorgos fresh chick peas were a great delicacy in July—a foretaste of the luxuries of later summer, when tomatoes, grapes, and prickly pears came available. Fodder crops might also be milled: on Amorgos, for example, barley fed to cattle was ground, though not that fed to sheep, goats, donkeys or chickens.

Time Stress: The Labor Requirements of Farming

The sheer drudgery of the activities described above may be highlighted by considering the absolute labor requirements. On Amorgos, harvesting was

reckoned to take about 1.5 man days/str. for cereals reaped with a sickle, 1 man day/str. for uprooted pulses and 0.3 man days/str. for pulses mown with a scythe. On Karpathos, cereals were cut higher than on Amorgos and took 1-3 man days/str., the higher figure reflecting the number of elderly women in the labor force. The faster rate was expected of hired labor and probably reflects, *inter alia*, a lesser degree of care in leaving weeds behind in the field. Barley, being shorter, took about half as long again as wheat and uprooting of the shortest cereals and of pulses was said to be slower still. In addition, farmers on Amorgos reckoned to need 7-10 donkey loads/str. to carry away the harvest from a good field—a time consuming task for the more distant fields.

The time spent on threshing and winnowing is less easily quantified as it so dependent on weather conditions and on the amount of human and animal labor which can be mustered to take advantage of favorable conditions and on the amount of human and animal labor which can be measured to take advantage of favorable conditions. Moreover, the time spent in winnowing could be reduced by reserving some of the crop as “aposoria”. This decision depended on the weediness of the crop and the ease with which it could be cleaned (given prevailing weather and available labor), as well as the competing claims of human and animal consumers. Overall, the labor required in crop processing is of the same order of magnitude as in reaping, and sometimes crops are left on the threshing floor for days pending suitable weather.

Ploughing with a pair of oxen was estimated on both islands to be rather faster than reaping—*ca.* 0.5-1.0 man days/str. for winter crops—but was again more subject to unfavorable weather conditions and offered fewer opportunities to make full use of a household's human labor force.

Such estimates of labor time mean little unless account is taken of the *scale* of agriculture production. Sanders suggests (on the basis of average yields in the Cyclades in 1916) a *subsistence* requirement of 7.5 str. in cultivation per head (Sanders 1984). An elderly farmer on Amorgos, brought up between the two World Wars, suggested a rather higher minimum of 12 str. of “migadhi” per head. Assuming cultivation of 7.5-12 str. per head, harvesting (at 1-3 man days/str.) would take 7.5-36 man day/head. The time available for harvest, therefore, covering some 30 days around the month of June, is far from generous for many of the families with several members too young, too old or too busy to participate in reaping. The same is true for the subsequent crop processing—a point underlined by the existence of verbs signifying the completion of individual threshing and winnowing tasks (‘πολῶνεψες/πολύχνισες; have you threshed/winnowed?’).

Only 4-12 days ploughing are implied per head (*excluding* fodder crops and fallow fields). For large families with a single plow team, however, the four month winter plowing season (November-February) would only be generous in favorable weather conditions.

Thus with traditional technology, farmers in the Greek islands operate under considerable "time stress" (Torrence 1983)—particularly at harvest time. In practice, the extent to which farmers are under time stress may have been seriously underestimated here, for reasons which are discussed in the following two sections.

Scale: The Role of Livestock in Arable Farming

A striking feature of the entire processing sequence on Amorgos is the extent to which it is integrally bound up with the keeping of livestock—and in particular work animals. On Karpathos, by contrast, where agriculture was very much in decline, work animals were relatively unimportant and this too manifests itself in the way crops are processed, the way processing residues are used, and in the labor costs of processing.

On Amorgos, the relevance of livestock to crop processing methods is most easily seen in their contribution to threshing. In Karpathos, where the areas harvested were relatively modest and animals available for threshing were relatively scarce, it was commonplace to see crops being threshed by hand. Donkeys and mules also play an important role in carrying reapers to the fields and then harvested crops to the threshing floors, while together with oxen they spend much of the winter and spring in ploughing.

The steeper and rockier parts of both islands support extensive natural pasture, but this is sparse and seasonal. For example, natural pasture makes up 75% of the 2000 ha. territory of Arkesini and is grazed during winter (from December if the rains start early). Fallow fields provide grazing from January/February until they are ploughed up in the spring, stubble fields from June until the first rains in October. Harvested pulse fields are preferred, but cereal stubble is also valued if cows or donkeys first consume the coarse material and make weeds and fallen grains available to goats and sheep (Bell 1971). Although the months of August and September, when stubble grazing is running out, are considered the leanest season, during much of the year natural pasture is more or less insufficient in quantity or quality both for cattle, goats and sheep being fattened or milked for the market and for oxen, donkeys and mules which are least free to graze at the times when they are working hardest. As a result, natural pasture is supplemented with considerable quantities of sown pasture and stall fodder.

Common vetch, grass pea and (on Amorgos) oat were sown specifically as fodder crops, barley partly so. On Amorgos, the two pulses were partly grazed *in situ* in March and April, by breeding cows, milking goats and fattening calves, and partly allowed to ripen for their seed, which was fed to the same livestock. In addition, the winnowed straw and chaff of all the cereals and pulses (except perhaps barley on Karpathos) were stored as winter fodder. The

unthreshed pods and cereal ears collected by coarse sieving were treated rather differently in the two study areas. On Amorgos they were fed to the nearest donkey as a "snack", while on Karpathos they were sometimes threshed again. This contrast may again reflect the small size of the harvest and the relative unimportance of work animals on Karpathos, compared to Amorgos. On Amorgos, chob, fine sievings and some "aposoria" were fed to poultry. On Karpathos, considerable quantities of "hay" were also stored up, both "wild vetch" and oat cut during April and the tangle of late maturing weeds pulled up from the stubble fields after the harvest.

The need to stall feed livestock greatly increases the difficulty of crop processing in four ways. Firstly, by planting fodder crops in place of the traditional fallow, the farmers of Amorgos have effectively doubled the size of the task facing them. Such crops are threshed and winnowed, even though both grain and straw/chaff are to be fed to livestock, because different animals need the two components in different proportions at different times. Secondly, although livestock was allowed to graze the stubble fields, most cereal and pulse straw was collected for stall feeding. Crops were deliberately cut low, therefore, and harvesting was even more backbreaking than on Karpathos, where crops were reaped at mid-height.

Thirdly, the great bulk harvested on Amorgos enormously increased the volume of crop to be transported from the fields to the threshing floors and then into the store. One farmer on Amorgos estimated that, to feed two oxen, a calf and two donkeys over winter, he needed 25 donkey loads of threshed and winnowed chaff (the produce of 15 str. in a good year). To be secure against late rains and the retarded development of natural pasture, he would need twice as much. Given the dispersed nature of land holdings, the harvested crops often had to be carried substantial distances and in the case of pulses, which tend to shatter and shed their seed in the heat of the day, this could only be done in the early morning or evening. After transport, the proportion of straw in the crop to be dried, threshed and winnowed further delayed processing for storage. Fourthly, the need to keep chaff and straw for fodder forced farmers to winnow in a gentle breeze and so slowed the processing yet further: indeed those with a large backlog would even attempt to winnow in conditions of almost dead calm. In strong wind, winnowing was suspended.

The crucial point to recall is that these extra burdens are being incurred at a time of year when farmers are already operating under acute time stress. Once crops have ripened, farmers are rightly anxious to get the grain and chaff safely in store, for crops growing or stooked in the fields or stacked on the threshing floor are vulnerable to sudden storms, theft or raiding by livestock. A striking feature of the southern Amorgos landscape is the widely dispersed distribution of threshing floors—a pattern which is enhanced by the freedom with which farmers are allowed the use of each other's threshing facilities. In effect, by winnowing and threshing close to the field, farmers can transport the vital grain

into store as rapidly as possible and deal with the bulkier chaff and straw afterwards. Similarly, on Karpathos, farmers store chaff at their field houses at Avlona and transport it back to Olimbos piecemeal during the winter as it is needed.

Today on Karpathos and Amorgos, nucleated settlement, dispersed land holdings and scarce human labor (to varying degrees on the two islands) enforce an extensive pattern of land use, which would not be practicable without the services of traction and pack animals. Farmers are thus locked into the system of crop processing and usage described, in which the muscle power and dietary requirements of work animals are paramount. If settlement were less nucleated, however, land holdings more consolidated or labor more abundant, then a less extensive pattern of land use would ensue. Less cultivation of marginal land and less production for market or to pay taxes etc. would have the same effect.

Below a certain threshold, the extent and distance of land cultivation would be insufficient to warrant the considerable capital expense of keeping pack animals, and the same is arguably true for pack animals. On Karpathos, some of the small gardens around Olimbos were tilled by hand and elsewhere in the Mediterranean small-holders have been known to replace work animals entirely by human labor (e.g. Delille 1977). Small scale cultivation also tends to be characterized by more intensive husbandry in other respects—for example, the irrigation of some gardens on Karpathos have already been mentioned. On Amorgos, the “gardens” with summer crops are widely dispersed (even though the benefits of proximity to home are recognized), because their location is determined primarily by the needs of individual fields for a bare fallow. Like the remaining fields, therefore, they are tilled by plough, but they are more intensively hoed and weeded. Moreover, in contrast to the broadcasting typical of the more extensive winter crops (Sigaut 1975), sowing tends to be by dibbling—a strategy which is less wasteful of seed corn and facilitates weeding and so on. With smaller scale cultivation, staple cereals might likewise benefit from more intensive husbandry and indeed on Amorgos, prior to the loss of labor through mass rural emigration earlier this century, even extensively cultivated cereals are weeded and the edges of fields were dug over to kill weeds missed by the plough.

Similar considerations of scale also suggest that cereal/pulse rotation may have been practised long before its introduction by agronomists in the 1930s. In the recent past, pulses have been grown for human consumption on only a modest scale (compared with cereals) and, on Karpathos, they are somewhat preferred for cultivation in the infield gardens. An important consideration here may be the relatively labor intensive nature of pulse cultivation—for example, on Amorgos, some of the winter pulses grown for human consumption, unlike other field crops, are weeded even today. Thus the 1930s agronomists may have succeeded not because they revealed the benefits of cereal/pulse rotation to soil fertility, but because they provided an incentive (the rearing of livestock as a

"cash crop") for the extensive cultivation of pulse crops at a *relatively* low cost in labor (for example, fodder pulses need less weeding than peas or lentils). It has already been observed that the recent development of continual cropping on Amorgos was not accompanied by irrigation, casting doubt on the popular argument that the traditional practice of bare fallowing was primarily a water conservation measure (Halstead 1987). Bare fallowing should be seen instead as an extensive method of weed control (and perhaps nitrogen replacement) in circumstances where the large scale of cultivation or the low premium placed on pulse fodder crops militates against cereal/pulse rotation.

Thus agriculture in the islands embraces both an extensive "field" component and an intensive "garden" component and their relative importance is integrally related to recent patterns of residence and land tenure.

Risk: Flexibility in Agricultural Practice

A further striking feature of farming in the islands is the complexity and flexibility of farmers' day to day decision making. Even a few days delay in harvesting ripe crops can lead to severe losses from birds and on both islands farmers question passers-by to monitor the state of ripeness of their more distant fields. Crops awaiting processing for storage are also at risk, however, and compete with the unharvested crops for the farmer's attention. Pulses must be reaped and transported when the sun is low, while threshing has to take place in the heat of the day, but different tasks often take place some distance apart—and of course it is important to take advantage of a good winnowing breeze when it springs up. To complicate the matter, the labor supply varies: a wife must occasionally attend to domestic duties; a teenage daughter can only help with tasks near the home, to which she is tied by her primary responsibility of looking after the milk goats; a grown son returning from town for the weekend makes a major inroad on the task of threshing. Moreover, the farmer may well have to balance his own interests against a responsibility to help elderly relatives, or he may wish to earn cash by working for another farmer unable or unwilling to endure arduous manual labor.

In addition to such day to day adjustments to their schedule, farmers face year to year variation, and their responses to this permeate every aspect of agricultural practice. Most obviously, perhaps, weather conditions vary and, in the semi-arid climate of the islands, even moderate variations in rainfall can be disastrous. It is essential, therefore, to take the fullest possible advantage of the modest winter rainfall and on Amorgos, this is reflected in a local saying stressing the benefits of early sowing: "το πρώιμον το ευλόγησεν ο θεός, και το έψιμον ο καλός καιρός" ("the early [sown crop] is blessed by God, the late by good weather"). On the other hand, sowing must not start before the winter rains are properly under way and, constrained by limitations of labor and of

days suitable for ploughing and sowing, farmers are forced to plant some crops late. The success or failure of these crops, in particular, is dependent on uncertain spring rainfall and the invariable response of the Amorgiot farmer to questions about his economic prospects is "ἀμα βρέξει ο Μαρταπρίλης..." ("if it rains in March-April..."). Because early sown crops are so much more reliable, it was customary on Amorgos to begin ploughing on the lower and more productive fields and then to proceed to the more marginal terraces (τα πεζούλια). The higher terraces were sometimes not worth reaping at all in dry years (and have been widely abandoned, on both Karpathos and Amorgos, with the post-war decline in rural population).

The broken terrain of the islands can also be an advantage and, on Karpathos at least, the dispersal of fields was reckoned to cushion the individual farmer somewhat against the dangers of an unreliable rainfall (and the indirectly related labor crises during ploughing/sowing and reaping/threshing etc.). Evidently, the dispersal of fields also provides growing crops with a partial defence against insects: on Amorgos, for example, *Bruchus* spp. were widespread pests of pulses (pea and grass pea being particularly vulnerable, followed by lentil and then common vetch), but the severity of infestation of each crop varied greatly from field to field.

Problems of variable weather can also be mitigated to a degree by planting a range of crops, requiring water and human labor at different times. On both islands, the diversity of crops was impressive, including a range of annual cereals and pulses as well as perennials such as olive, vine and fig. Of particular interest on Karpathos is the cultivation of no fewer than nine winter sown pulses. On Amorgos, a slightly narrower range of crops was grown, but farmers were conscious of the particular soil preferences of each. For example, the red "firoyi" (φειρόγη) soil (formed on limestone) (Geological map of Greece 1985) was easier to work when wet and less susceptible to drought than the grey "psaroyi" (ψαρόγη) soil (formed on shales/schists and graywackes) and was preferred for wheat. Wheat might be sown on "psaroyi", however, when a farmer's "firoyi" plots had to be devoted to pulses. Also wheat tended to be sown, where possible, immediately after bare fallow or on fields which had been generously manured. Common vetch and grass pea could be grown on weedier plots and poorer soils than peas or lentils. Farmers also took great interest in the performance of individual fields and usually knew the recent "case history" (yields, sequence of crops, date of last fallow etc.) of their own fields in some detail. Thus although cereal/pulse rotation was quite unambiguously the norm, the decision as to what should be sown (and when) on any individual field was subject to a host of considerations and some farmers very much emphasized this flexibility and underplayed the existence of a norm.

A further element of strategic diversity is the sowing of mixed crops. It is unclear whether bread and macaroni wheat were sown together deliberately to reduce the likelihood of complete failure, though farmers on Amorgos at least

were perfectly aware that the wheat crop was mixed. The sowing of wheat/barley and common vetch/grass pea (/pea) maslins on Amorgos, however, was quite explicitly perceived as a way of "hedging bets". Wheat and barley made up widely varying proportions of "migadhi" seed corn, depending on the quality of the field and the availability of seed, but their relative contribution to the harvest also depended on the growing conditions in a given year. Plentiful rain during the growing season tended to favor the more highly valued wheat. The pulse maslin represents a compromise between the preference of livestock for grass pea and the greater productivity and resistance to infestation in the field by *Bruchus* spp. of common vetch.

The great flexibility of the wheat/barley maslin becomes even more apparent during processing. In good years, the crop tended to be both abundant and relatively rich in wheat and the grain was separated with a special (4-5 mm mesh) sieve into wheat- and barley-rich fractions, the former being used for bread or sold for cash, the latter for fodder. In bad years, bread would be made largely from barley and the livestock would not be fed grain. In the recent past in Greece, human consumption of "animal fodder" in bad years can be widely documented. In Karpathos, for example, bitter vetch was eaten as a famine food during World War II, after first being ground and soaked to remove toxins. The Amorgos maslin allows human consumption of fodder at minimal social cost, however, because all wheat and barley crops are to some degree mixed: one poor individual buying "barley" (the term used by the farmer who grew the crop) for his own consumption was able, on the strength of a slight admixture of wheat, to classify his purchase as the more acceptable "migdhali".

Since years of poor grain harvest often also yield a poor harvest of straw, and follow a dry winter or spring with reduced grass growth, it is apparent that the victims of this example of human flexibility are domestic livestock. Indeed it might be argued that one of the most valuable functions of domestic livestock on Amorgos is to provide a rationale for the regular overproduction necessary for farmers to have a chance of breaking even in poor years.

The sowing of a range of crops and a policy of overproduction are only a partial defence against shortage. The severest weather conditions may affect all crops, while sudden losses of labor through illness, injury etc. may make underproduction inevitable. For this reason, it is commonplace to keep enough food in store to meet the requirements of both the current and the following year (Forbes 1982): at the time of the 1981 harvest on southern Amorgos, farmers still had much of the previous year's crop in store.

Apart from the possibility of dramatic losses through theft or fire (on Amorgos, food fodder and seed grain alike were stored in the house), stored grain is also liable to weevil attack. On Amorgos, wheat seemed more vulnerable than the hulled barley to attack by *Sitophilus* spp. in storage. *Bruchus* spp. infested growing pulses, but the extent of damage only became apparent during storage, once all the pests had emerged. One farmer described the

traditional practice of pit burial, or "lakkiasma" (το λάκκισμα) as offering protection against insect pests. After processing, grain was placed in a straw/chaff lined pit (2 m in diameter and 1 m deep) in the fields and covered with soil. Burial for the period of "40 days" caused some grain to sprout, but killed pests in the crop (presumably by starving them of oxygen) (P.C. Buckland 1981). Thereafter the grain was dug up and transferred to long-term storage in the house in chests of wood (τα μπάρια) or stone (τα ριά), each said to hold 100 "kila." "Lakkiasma" may have limited damage by *Bruchus* spp. and other field pests, but will not have provided any protection against *Sitophilus* spp. populations established in the storage chests. Even with this precaution, therefore, storage has its limitations and, once the target of two years' supply was reached, farmers would sell surplus grain—in effect converting it to more flexible and (usually) more durable medium of money (Forbes 1989).

When stores ran out, a range of further responses is remembered from the recent past. On Karpathos, it is said that help was initially sought from relatives, in the form of loans of food. Alternatively, farmers in need might work for their richer neighbors, helping to build a barn or assisting in such tasks such as reaping and ploughing, in return for grain. Exchanges between farmers and shepherds are also recalled. Only as a last resort would farmers seek to buy grain on the market, working in Athens or Rhodes to earn the necessary cash. On Amorgos, needy farmers have in living memory sometimes bought grain from other farmers: from neighbors in Kolofana, when slight differences between individuals in choice of sowing time have made the difference between success and failure, and from other villages in the southern part of the island, when failure has been more widespread. The money for these purchases presumably came from sales both of surplus grain and of "cash crops"—tobacco or, latterly, cheese and meat. In more desperate situations, farmers start selling off their fields (and even their children) so offering more fortunate farmers the opportunity to convert money to the more stable and profitable form of land. The last resort of the failed farmer is to abandon the land altogether and recent emigration has been particularly prevalent among farmers with too little land to be economically viable. Those who have stayed behind, expanding their holdings by buying land from emigrés, have tended to be farmers of moderate wealth (Sutton 1978).

Discussion

This partial account of traditional farming on two Greek islands is of interest in its own right as a record of disappearing local customs and language. The farmers of Amorgos and Karpathos also offer some far wider insights into Mediterranean agrarian ecology, present and past (Hillman 1981, 1984a).

First, the highly seasonal nature of agricultural activity and the uncertainty of the weather conditions required for some tasks conspire to place farmers under serious time stress at certain critical times. This is particularly true of the early summer period of harvesting and processing staple cereal and pulse crops and, perhaps to a lesser extent, of the winter ploughing season (Aschenbrenner 1972). This problem of seasonal time stress is often concealed in modern surveys of rural (under-) employment in the Mediterranean (Wagstaff and Augustson 1982) or in estimates of the labor requirements of farming in antiquity (White 1965).

Secondly, this study highlights both the vital role of work animals in ploughing, threshing and transporting produce and the remarkable extent to which their maintenance conditions the methods and labor requirements of arable farming. Not only would traditional extensive agriculture be impossible without work animals, but work animals would not be worth maintaining without extensive agriculture. For certain periods of the past, quite different social and demographic conditions have prevailed (Garnsey 1979; Vergopoulos 1975), demanding a form of land use far less extensive than today, in terms not only of quantity—the area cultivated—but also of quality—the methods of husbandry employed. The gardens of modern Karpathos and Amorgos may often be a more appropriate model for ancient cultivation than are the present-day fields—and indeed a recent archaeobotanical study found that cereal crops at bronze age Assiros Toumba (Macedonia) were associated with more “garden” weeds than were modern cereal fields on Amorgos (Jones 1992). Moreover, the techniques of intensive horticulture are so different from those of extensive agriculture that great caution should be exercised in extrapolating recent labor and production norms back into the distant past (Halstead 1987).

Thirdly, the reluctance of many farmers to offer such norms reflects the essential variability of the conditions with which they must cope. Indications of future weather patterns, in both the immediate and more distant future, are eagerly sought in atmospheric conditions, the behavior of birds and so on, and a similar concern in antiquity is implied by Hesiod’s linking of his calendar of agricultural tasks to such natural phenomena in the *Works and Days*. In response, farmers constantly adjust their practices, juggle with scarce time and labor and reschedule competing priorities in order to complete the most urgent or essential tasks. Such flexibility, well illustrated on Amorgos by the frequent tactical decision to retain “aposoria” during crop processing, is a vital element in the armory of the Mediterranean farmer.

Fourthly, the impact of variation in production targets, land, labor or weather is heightened by time stress which may leave little scope for postponing a task, when labor is scarce, or for sowing a larger area, when stores are low. Island farmers use an impressive array of ploys to dampen the effects of variability, taking progressively more drastic measures to avoid the risks of failed harvests, food shortage and finally hunger.

Some aspects of the response to agricultural risk in the islands are particularly worthy of note. The growing of a range of different crops is a widely documented practice (e.g. Forbes 1976b), but the discovery of *L. clymenum* and *L. ochrus* cultivation on Karpathos suggests that the extent of crop diversification may have been significantly underestimated in the literature on recent Mediterranean agriculture. The confusing, recent nomenclature for pulses in the islands also suggests potential problems for the investigation of crop diversity in ancient, written sources (Faure 1985; Jasny 1944). For example, the pea has a local name on both Karpathos (το γλυκίδι) and on Amorgos (το κατσούνι), while one of its common mainland names (ο αρκάς) is applied in the islands to the rare *L. clymenum*. Also, a variety of pulses may be referred to as "fava", because they are "split" and eaten in a gruel, while the term "fasoli" covers pulse crops of two separate (*Phaseolus* and *Vigna*).

A precautionary policy of overproduction and of storing more than one year's supply of food is also documented elsewhere in Greece (Forbes 1982) and indeed the production of such a "normal surplus" is arguably a minimum requirement of farming in a highly seasonal environment (Allen 1965). Recent risk-buffering behavior thus suggests a simple solution to the thorny problem of how emerging elite minorities in the islands in the later prehistoric and early historic periods commanded the resources which they needed to support themselves. Rather than *stimulating de novo* the necessary overproduction (Gamble 1979, 1982a), they may simply have commandeered existing "normal surplus" (Halstead 1989).

The integration of crop production with animal husbandry (particularly flexible in the case of the Amorgos wheat/barley maslin) is also of interest. In years of surfeit "human food" may be directed to livestock, while "animal fodder" may be requisitioned for human consumption in times of scarcity (Grmek 1983). The cultural distinction between food and fodder is thus observed somewhat loosely (which incidentally poses problems for both archaeological and literary recognition of ancient fodder crops). This flexibility is invaluable as a buffer against risk: in good years livestock provides an incentive for overproduction and in bad years overproduction reduces the risk of shortage. Such use of livestock as a "safety-valve" for arable economies, both on a household and on a regional scale, has been suggested for prehistoric and early historic Greece (Halstead 1981, 1987; Cherry 1988; Hodkinson 1988) and is likely to have been widespread in other parts of the Mediterranean too.

On Amorgos much of the animal produce which results from the feeding of grain to livestock is sold for cash, which may in turn be converted back to staple foodstuffs in time of need. Some surplus grain is converted directly to money and some wheat is grown specifically for this purpose, commanding a higher price as a cash crop than the more reliable (and so more abundant) barley. Given the unreliable rainfall of the islands, a substantial net "surplus" is likely to be off-loaded on the market in good years. It is highly questionable,

therefore, whether sporadic historical records of exports from the islands in individual years can be used as evidence of changing agricultural goals (e.g., Wagstaff and Augustson 1982)—let alone as a measure of average potential “production beyond subsistence” in antiquity (Renfrew and Wagstaff 1982). On the contrary, most records of a “grain trade” in both recent and ancient times in the Mediterranean probably reflect *short-term* conditions of surfeit and shortage (Garnsey et al. 1984). Clearly a subject deserving further investigation is the extent to which more specialized cash crops (e.g. tobacco in early twentieth century Amorgos, olive oil in archaic and classical Athens) have been raised with a view either to exchange for grain or to securing money as a medium of long-term storage.

A final point of interest concerns the long-term consequences of risk-related transactions in labor and land. Successful farmers convert surplus grain to the increasingly durable forms of cash then land, while needy farmers dispose of labor, cash and finally land to make good shortfalls of grain. In the short term, such transactions ensure the economic survival of many households, but in the long term they may undermine their viability and in recent centuries have often paved the way for increasingly sharp inequalities of wealth (Vergopoulos 1975). Similar processes must have been a frequent vehicle for social change in antiquity (Austin and Vidal-Naquet 1977).

Even without the use of money or alienation of land, successful farmers may acquire rights to the labor of others, (Richards 1939), by releasing surplus grain in years of dearth, and may reinforce their position by acting as intermediaries in the disposal of surplus in years of plenty (Garnsey and Morris 1989). In this way, in the risky agricultural environment of the Mediterranean, the few have repeatedly commandeered the “normal surplus” of the many.

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APPENDIX

Common Names of Weeds or Cereal and Pulse Crops (Amorgos)

<i>Common name*</i>	<i>Latin name</i>
το αγριάσταχο	<i>Hordeum murinum</i> ssp. <i>leporinum</i> (Link)
η αγριοπερικοκλάδα	<i>Convolvulus altheoides</i> L. & <i>C. arvensis</i> L.
ο αίλαμος	<i>Avena sterilis</i> L.
ο ασπροβολβός	<i>Ornithogalum narbonense</i> L.
το βαρελάκι	<i>Medicago turbinata</i> (L.) All.
η βελονίδα	<i>Scandix pecten-veneris</i> L.
ο βολβός	<i>Muscari comosum</i> (L.) Miller
η γύρα	<i>Lolium temulentum</i> L.
η δρούβα	<i>Hirschfeldia incana</i> (L.) Lagreze-Fossat & <i>Sinapis arvensis</i> L.
ο κόλιανδρος	<i>Bifora testiculata</i> (L.) Roth
ο κολίσσανος	<i>Galium aparine</i> L.
το κόπανο	<i>Rumex pulcher</i> L.
ο μαζάς	<i>Phalaris coerulescens</i> Desf.
η μαντελίδα	<i>Chrysanthemum coronarium</i> L. & <i>C. segetum</i> L.
η μολόχα	<i>Malva sylvestris</i> L.
η ξυλόγυρα	<i>Lolium perenne</i> L. & <i>L. rigidum</i> Gaudin
η παπαρούνα	<i>Papaver rhoeas</i> L.
ο πεντάλευρας	<i>Plantago lagopus</i> L.
η πικροραδίκια	<i>Cichorium intybus</i> L.
η ρασινίδα	<i>Anchusa azurea</i> Miller
ο (τσαλα)πετεινός	<i>Gladiolus italicus</i> Miller
η φιραλονίδα	<i>Reseda lutea</i> L.

*Some common names may also be applied to other species of similar appearance to those listed.

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Common Ground and Common Good: Four-Field Anthropology along the Margins of Europe

Susan Parman

I am neither an archaeologist, an Aegeanist, an environmentalist, nor a cultural ecologist. I am, however, firmly grounded in a commitment to four-field, collaborative research to illumine significant issues in the practice of anthropology as a humanistic science. In this paper I explore the relevance of Europe, and especially European fringe communities, in the debate about four-field anthropology and the practice of anthropology in general.

European "fringe" communities have recently played an important role in the debate within the European Union about the importance of preserving environmentally protective, diversified economies. In this era of emphasis on the politics of identity, one of the most potent coins of exchange is to claim ecological ascendancy over one's competitors—to claim to be more ecologically sound, to hold the key to ecological salvation in the world's crisis; to serve as the politically correct example. Anthropologists have sometimes provided false consciousness in interpreting communities, especially when they are used as the repository of romantic images of the Garden of Eden—for example, in the image of hunter-gatherers as coke-bottle missionaries come to save the world through ecologically sound practices (as implied by the title of a symposium held at the American Anthropological Association meetings in 1993 called "Ecologically Noble Savages? Resource Conservation by Native Peoples"). The ecologically sound primitive, the Garden of Eden in our primitive past, may be found in the European fringe as easily as the Kalahari Desert.

Greece, as a popular contender for the title of cradle of Western civilization, and yet ambiguous in its occidentity, is the quintessent European fringe community—for its geographical and cultural marginality between occident and orient, for its temporal marginality as the cradle of Western civilization, for its ethnographic richness in supplying examples of nomadic technology, pagan rituals, and time-locked peasantry (for the complex uses by anthropologists of Europe and various parts of Europe, see Parman 1997). Some

of the papers in this volume draw upon multidisciplinary evidence to shed light on whether the Aegean now has and/or once had a different ecology that was either golden/Eden-like/pristine/ecologically sound, or primitive/undeveloped. I found parallels between this research and my own observations that Scottish crofters (sometimes defined as modern representatives of the Iron-Age past—see discussion in Parman 1990:23) are now being represented as practicing an ecologically more effective small-scale agriculture that should be used as a model for agricultural practice in the European Community (Parman 1993).

European “fringe” communities have often served as laboratories for the study of cultural processes. They are often seen as small-scale capsules of the larger complex whole. Usually conceived of as the periphery rather than the center, they have represented the equivalent of the non-Western primitive Other (our pre-Western, primitive past), the least susceptible to centralized control but at the same time the most vulnerable to sociocultural change, for example, to the effects of ecological disasters that attend structural violence—so in this sense they are a bit like salamanders, sensitive indicators of the world’s ecological balance. The communities of the European fringe studied by anthropologists tend to be economically small-scale, closely bounded communities heavily reliant on kin and neighborhood networks that are often interpreted as resisting modernizing influences and “embodying tradition.” They are frequently thought of as museum-like repositories of archaic languages and customs, and the locus of traits frequently used in nationalist ideologies because of their association with archaic origins and the early stages of development of a unique and deeply rooted nation.

Although many studies of Europe have treated communities as tribal island communities much like the Andamans or the Trobriands, many more have interpreted them as a small-scale context in which theoretical and methodological insights might be gained on global systems and large-scale processes. European fringe communities conceptually link pre-modern with modern, Us with Other, local with global. It is easier, in European fringe communities, to think of a continuum from local small-scale community to supranational world system, and to be tempted, like sociologists, to solve the problems that we somehow inherently know must be solved. This is the case because we are not restrained by the humility of being ignorant outsiders and are convinced, rather arrogantly, that we are familiar with what needs to be fixed to cure modern Western civilization.

This book deals only fleetingly with such speculations and suggestions. It is more modest in its scope, more responsible in its theory, and will ultimately outlast its romantic competitors. This is a “grounded” book: grounded in landscape, grounded in economic assumptions of cultural adaptation; grounded semiotically in the cultural construction of a sense of place; grounded in the sense of being pragmatic; grounded in the sense of being environmentally aware

and economically sensitive; and also grounded in Julian Steward's model of cultural ecology—a theoretical framework that integrates the theories and operational definitions derived from biology, evolutionism, and general systems theory, and validates its model using ethnographic evidence.

Culture is often defined as an adaptive mechanism, but Steward's theory fleshes out this skeletal definition and suggests the significance of collaborative, crossdisciplinary perspectives. Humans make choices within environments, and both environment and culture effect changes in each other and in the conditions that affect biological processes. The evidence left of human action within the environment constitutes signs to be interpreted by those who can read culture and environment. Archaeologists working with the assumptions of cultural ecology translate knowledge about available resources and cultural options into statements about production. The production of the past can be compared with production in the present, and the production of the Aegean coast can be compared with the production of the Atlantic seaboard or anywhere else in a classic comparative model. Areas with similar soil and water conditions can be compared with regard to the cultural strategies adopted, as measured by production. Biologists, hydrologists, and geologists are excellent collaborators in such projects, but the information is integrated through questions posed by archaeologists and cultural anthropologists who assemble information in a matrix whose underlying purpose is to demonstrate human cultural (and biological) adaptive strategies in particular environments.

How might the goals of a four-field collaborative anthropology be developed, based on the approach represented by this book? The central focus should be on writing culture, or doing ethnography, of a particular region (the common ground of interdisciplinary attention). This local region ethnography should be conceived of as a collaborative effort, focused on the region and organized by asking what different fields can contribute to understanding the past, present, and future of biocultural adaptation in that region.

This idea brings up a general issue for anthropology. Anthropology is at an interesting junction in its discussion of whether the "four-field integrated" model is passé. Throughout the 1992-93 academic year anthropologists debated Clifford Geertz's gauntlet, thrown down (or, as he has said on several occasions, thrown away without much thought) in 1991 in the journal *Current Anthropology*, that the notion of anthropology as an integrated discipline of four fields was a myth. Responses to the challenge in the *Anthropology Newsletter* emphasized the importance of different perspectives in approaching research issues—for example, in ethnobotany (Miller 1992). Anderson (1992), Goldschmidt (1992), Parker (1993), and others were especially vehement in affirming the importance of interdisciplinarity in distinguishing anthropology as an eclectic, empirically flexible discipline.

Geertz's attack on anthropology as an integrated discipline of four fields is part of a larger trend in the blurring of boundaries among disciplines, a

development of interdisciplinarity that begs us to look at the roots of anthropology itself. The fact that there was such a flurry of defensive responses to his gauntlet (and that he himself was reluctant to reaffirm the statement) indicates that the four-field concept is alive and well; but the comments defending the four-field approach also embrace a conception of anthropology that reaches for even wider forms of interdisciplinary collaboration. As Brown and Yoffee suggest (1992), the relationship between and among the four fields is relatively unimportant as compared with anthropology's ties with non-anthropological disciplines such as biology, history, literature, and philosophy. Indeed, the extensive discussion of collaboration at the American Anthropological Association meetings in 1993 spotlighted anthropology's relationship to, in the words of the Presidential Symposia, "anthropology as practiced by nonanthropologists." In particular, American anthropologists are negotiating the scholarly politics of postmodernist cultural critique.

Drawing upon Marcus's (1991) discussion of textual communities in humanities centers, I suggest that Europeanist anthropologists have functioned, or have the potential to function, as an interpretive community that has been inherently heretical, blurring the boundaries between the discipline of anthropology and other disciplines associated with the study of complex, modern societies; that it has provided the ideal vehicle to examine postmodern concerns with textuality vs. orality, diachronic and synchronic, self and other, and to participate in the widespread revitalization movement which appears to be occurring among numerous disciplines.

The anthropology of Europe, and in particular the study of European "fringe" communities, enables us to address issues that lie at the foundations of our discipline. According to Goldschmidt (1992), four-field anthropology was an invention of Franz Boas, who was trying to address the rampant racism of his day: to provide a position from which we could disentangle the contributions of biological variation and cultural causality to ethnic identity and conflict. Anthropology has the opportunity to address the same issues today; and in the anthropology of Europe, the fish, as Margaret Mead would say, has returned self-consciously to study its own watery environment—and to seek to apply a holistic, humanistic perspective to the problems of racism, neo-Nazism, and issues of blood and culture in defining identity.

The question that has driven anthropology since the Enlightenment has been the question, what makes us human? Faced not only with the enormous range of biological and cultural diversity revealed during the expansion of Europe outside of Europe but with the issue of the great diversity of human freedoms (Becker 1971), anthropology emerged as a discipline dedicated not only to the common ground of humanness but to its common good: how can an integrated science, drawing upon its complex understanding of biocultural diversity in an evolutionary framework, address these differences?

The anthropology of Europe has, on the one hand, the potential to serve as a conservative reinforcer of the traditional authority of the anthropological canon (capsules of orientalist otherness studied by the occidental us), or as a heretical and reformist interdisciplinary community within which a canon of critique may be forged (Marcus 1991:394). Critical of itself, using itself, quick to be eclectic in adopting various critical and disciplinary perspectives, incorporating history, political models, philosophy, literature, and so on in its hermit-crab march along the ocean floor, Europeanist anthropology is frequently a cauldron, a bouillabaisse of indeterminate contemplation. Eric Wolf challenged both anthropology and Western civilization when he wrote *Europe and the People Without History* (1982)—he invited anthropologists to write globally, incorporating the West in their analysis instead of treating it as an unexamined framework of the self. Having absorbed and assimilated the critique of ethnographies as written texts and of anthropology as a discipline rooted in a colonial past flawed by unexamined Western cultural assumptions, anthropology has the potential, especially and most appropriately (in an ironic sense) through the anthropology of Europe, to test the relevance of the discipline for global analysis. It can transcend the division of the world into geographic/cultural categories defined by the us/other binarism and achieve an awareness of processes that permeate a single world. This is ultimately the common ground (and the resolution of inequitable distribution of freedoms its common good) of all studies of humankind. If anthropology cannot do this in Europe, it cannot do it anywhere.

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Final Remarks

Mark T. Shutes and P. Nick Kardulias

Throughout the long germination process of this volume, with papers submitted, revised, resubmitted, and again revised, some major recurrent themes in the contributions have always sustained us. Though mentioned at the beginning of this work, we believe that they bear reiteration here: (1) the efficacy of studying culture and the environment as interactive systems; (2) the need to focus upon human beings as active participants and decision-makers within these interactive systems; (3) the increasing awareness of the importance of both of the above on the part of archaeologists, classicists, ecologists, ethnoarchaeologists, ethnographers, historians, and other social scientists interested in Greece, and (4) the value of collaborative and interdisciplinary techniques in pursuing such research.

With regard to the first theme, discussions in this volume ranging from architecture to oregano cultivation clearly identify culture and the environment as interactive processes, with human beings devising cognitive systems which shape and are shaped by their environmental experiences. To be sure, cultures rarely fit their environments like hand-tailored clothing, for both components are continuously dynamic, but neither do we find naked cultures, where every shared symbol leads to ecological disaster. Most cultures are "off-the-rack," providing the broadest possible guidelines for ecological success within the known limits of an environment. Further, cultures are not "green"; we can rarely survive within climax environments, since they generally lack the diversity of resources upon which we depend. As we have seen time and again in this volume, the inventiveness of human beings lies in their ability culturally to impose variability upon their supply of natural resources and to prohibit a return to the climax state. Sometimes such impositions fail in the long run, since humans cannot have perfect knowledge nor control of their environmental circumstances, but more often than not they succeed long enough to at least be succeeded. For the contributors to this volume, it is not possible to imagine Greek cultural systems sheared from their environmental roots and studied like some hydroponic hothouse flower. We concur.

The second theme would seem to be the most obvious of them all, and yet it is the one with which anthropologists, at least, have historically struggled. What happens when a culture changes? Clearly, a sufficient number of individual members of that culture have arrived at the conclusion that the older way of behaving is no longer sufficient, and so they choose to behave differently. The individual as active participant and decision-maker is at the heart of anything we might define as change. It would also seem obvious that some of the most important decisions that individuals make concern the ways in which they manage their productive resources. Changing or modifying production strategies will affect their entire set of social interactions, and the rules that govern them, and, as we have seen in this volume, human beings are continuously "tweaking" their production systems for a number of reasons, including, but not limited to, war, environmental change and variability, trade, new markets, and the economic pressures that come with changing political hegemonies. The contributors to this volume are not able to entertain the notion that individual humans in Greece are simply blind followers of previously existing and unchanging cultural rules because the evidence from their respective disciplines is overwhelmingly to the contrary. Human beings must regularly alter their production strategies, and must, therefore, continuously negotiate their cultural rules and alter their behavior. To understand these processes correctly, one must emphasize this active, participatory role of individuals. Again, we concur.

The third theme coincides with our general objective in editing this volume, which is to demonstrate an increasing convergence of opinion and evidence regarding themes one and two among diverse scholars of Greece and the Aegean region. Although some of the participants have worked together before, each brings a unique set of interests and/or disciplinary approaches to their respective articles, and each article could stand alone in some other context. And yet they all share, in one degree or another, the two common themes mentioned above. We do not believe this to be an accidental occurrence, but rather an indication of the growing awareness of the importance of studying the interactive systems of culture and the environment within the context of individual decision-making. It is not likely that we could get complete agreement on this last from all of our contributors, but in hearing and editing each other's papers for this volume we have come to understand that these are, at least, the common threads that seem to unify our research efforts.

The fourth theme concerns the value of collaboration among all the disciplines of anthropology and other fields. This point flows from the previous three. Though such collaborative work in the Aegean area began with the interests of archaeologists in mind, they quickly realized the need to incorporate research from other fields. While the fit is not always ideal, the interplay among the various disciplines provides an invaluable cross-pollination—all the disciplines gain valuable insights.

As an appropriate ending point, we might ask, where do we go from here? What is gained by conducting such research, especially in the Aegean area, and where may such interests lead us in the future? There is by now a substantial tradition on which to base additional studies. The work in modern Greece has taken the interdisciplinary focus further, has in fact made significant contributions to such research. We hope that this wealth of data and theoretical sophistication will become increasingly available to a wider reading public. Greece is an area where innovative, not just derivative work occurs. While the Aegean region is on the geographical fringe of Europe, much of the recent research there is central to the concerns of anthropology and other disciplines. It is holistic in the very best sense of that word. Anthropology, like many other disciplines, has in the past decade or so been wandering through a maze of theoretical musings, doubting the substance of its work and the orientation of the field as a whole. We have even generated a movement whose aim is the dismemberment of the discipline as it has developed over the past century. One answer to the question posed at the beginning of this paragraph is to stay the course—the four fields have served us extremely well and have made possible the sort of collaboration which this volume extols. We trust that the papers in this collection demonstrate the continuing value of a cohesive anthropology. Work in the Aegean clearly has benefited from the collaboration of the subdisciplines and with other fields of study. As anthropology ponders its future, we urge our colleagues to come home to the focus which made the discipline unique in the first place.

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